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THE FARMER'S DIGEST

FORT ATKINSON, WIS

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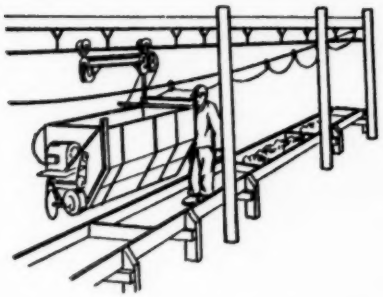
The Farmer's Digest

Volume 19 March 1956 Number 9

A Feed Box That's Mechanized



Electric motor and auger enables feeding of 60 cattle in eight minutes . . .

Condensed from
Electricity On The Farm

Arthur H. Schulz

AN ELECTRIC motor driven auger installed in a portable feed box enables Fred R. Topp and Son of McHenry, North Dakota, to feed 40 to 60 head of feeder cattle in from five to eight minutes. Topps had an electric feed mill and silo unloader, and they wanted a portable feed box they could load directly from their silo unloader, add their ground feed and concentrate, move the unit out into the feed lot and mechanically unload the feed directly into the feed bunks.

They built a portable feed box unit that is about thirty inches wide and five feet long. The feed box, riding on manure carrier type trucks, is pushed along by hand over the outdoor feeding bunks as the auger described below unloads it. It has a sheet metal bottom sloped to accommodate an eight inch auger taken from an old combine. The auger is supported by sleeve bearings on each end of the center shaft. A ¾ hp electric motor drives the auger through the belt and chain driven speed reducers and the gear drive on the auger.

The amount of feed placed in the feed bunks is regulated by the speed at which the feed box is pushed over the bunks.

One of the very interesting

Reprinted by permission from Electricity On The Farm, New York City, N. Y.

features of this installation is the method used to overcome the problem of handling the extension cord. The extension cord was first made into a 15 to 18 inch diameter coil. One inch steel rings were taped onto the cord with one ring at the top of each coil. To support the extension cord above the motor as the box is pushed along the tract, a heavy wire, long enough to reach the length of the feed bunks, was strung through the rings and attached to the end poles that support the overhead track. As the feed box is moved down the row of feed bunks, the extension cord uncoils itself and slides along the heavy wire.

Silage mixed with ground feed pours out of the end of the box as it is pushed over the feed bunks. The amount of feed placed in the bunks is regulated by the speed at which the feed box is pushed along.

The Topps are well satisfied with their unit. Occasionally the silage bridges over the auger, but Topp carries a showman's cane and a jab into the bridged silage starts it feeding again. Topp thinks a small chain and cross bar apron similar to the type used in a manure spreader would be easier to build than the auger and would very probably reduce the size of the motor that is required to drive the unit. Freezing has not been a problem.

Pushing the unit out over the bunks when the cattle are in the lot has been no problem as the feedbox is high enough to avoid hitting the animals' heads.

Soil Bank Won't Solve Ag Dilemma

The "soil bank" plan proposed by the Eisenhower administration will give farmers more purchasing power but it won't control production or surpluses for long. That's the opinion of Dr. Arthur Mauch, a Michigan State University farm economist.

But the soil bank plan, said Mauch, stacks up as one of the best choices for the taxpayer, consumer and the farmer to get a good return on the investment. The plan calls for storing soil fertility for future use instead of storing grain and other products in government store houses. That includes seeding land to soil building grasses and legumes.

And that, emphasized the economist, is one reason the plan won't control production. The soil removed from cash crop production will yield even more when it is again cultivated. That in addition to more know-how in getting bigger yields will boost production higher. *Michigan State University*

Can We Throw Away Rotations?

Maybe we can, as we find ways to grow continuous corn and hold our meadows up to 10 years . . .

Condensed from Successful Farming

George D. Johnson

WE'VE lived so long with rotations we've almost forgotten they are a problem. Yet for 200 years, we have methodically "depleted" our soils with grain, then given them a shot in the arm with legume nitrogen.

But now, changes are ahead. Two new practices have reached a point where we can see an alternative to this basic legume-grain merry-go-round. Continuous corn frees us from the need of growing a crop of legumes before every one or two corn crops. Stands of legume grass which can be maintained 5 to 10 years reduce the need for reseeding so often and provide a logical companion to continuous corn.

Instead of a 3- or a 5-year rotation, you have a 1-year rotation—you are only committed a year at a time on much of your acreage and can shift around much more freely.

You can better fit your crops to your soil, more grass on the poorer soil, more corn on the best land.

You can shift your cropping system with more freedom as the needs of the coming year seem to dictate.

You can increase acres of high-profit crops much more rapidly if the outlook calls for it. Just because a field has been in corn two years does not mean it couldn't go back in corn again.

Farm might be split this way

A. Deepest, best-drained, level soil: Could be continuous corn, if heavily manured and fertilized.

B. Medium soil, shallow, low fertility: Planted to small grains, soybeans, legumes most of the time.

C. Steepest, thinnest, and drouthy soils: Held in continuous meadow most of time; fertilizer top-dressed.

Continuous corn means that you can put corn on your very best land. Your deepest, best-drained (but not drouthy), highest-organic-matter ground will make more corn year after year

Reprinted by permission from Successful Farming, Des Moines, Iowa

if properly handled than any other acreage you can put in corn. These could be allotment acres.

Continuous corn lets you put corn on your levelest ground more often and you can keep the hills in grass.

Continuous corn is very likely the most profitable use of land which has been heavily fertilized for 100- to 150-bushel yields. The carryover nitrogen from such high fertilizing rates can't be as efficiently used by small grains. They require much less N. Therefore, you may want to consider heavy fertilization of your best corn ground and hold it in corn.

The remainder of your farm you can treat accordingly — a smaller amount of fertilizer would assure top yields of small grains and soybeans. Only phosphorus and potash will be needed on legumes. This has extra appeal in a time when you want to grow the most corn possible on your allotment acres, but can't afford the fertilizer over a rotation to build up every field on the farm to the 70- to 100-bushel corn level.

Another advantage of continuous corn—subsoil moisture made more than one corn crop during the recent drouths. Low ground usually has a higher subsoil moisture year in and year out than upland, therefore, can stand a drouth better.

The livestock farmer who may not find it profitable to stay within his acreage allotment can go even further in increasing his total farm production. He can hold the acreage he needs in grass legume for an indefinite length of time and, soil permitting, can put the remainder of the farm in corn.

Long-lay meadows have the added advantage of providing a backlog of fertility you can draw on at times. They will be built up ready to go to grain in a year if it looks advantageous.

Of course, leaving meadows down longer eliminates the cost of reseeding so often.

As with most things, all is not solved with one-year rotations. They are based on inexpensive nitrogen to replace legume nitrogen. You, therefore, have to watch comparative costs. As corn drops lower in price, continuous corn is less attractive. A point to remember is that the big effect of legumes is when the manure is returned to the soil, so a relatively inexpensive continuous corn program is possible if you use manure supplemented with fertilizer.

A problem, too, is having all rolling ground. They are working on that, too. Soon we'll give you complete instructions on how to grow continuous corn different ways, even on more rolling ground.

Now is the Time to Cull Cows

Many factors have to be taken into consideration in culling dairy cows...

Condensed from American Agriculturist

R. W. Spalding, Cornell University

THERE is good reason to believe that most herds should be culled more closely than is being done. This is particularly true of lower producing herds, herds averaging around 300 pounds of butterfat or lower. The owners of many such herds could profitably cull the lower sixth of the herd. This would make possible better care and more feed for the rest of the cows, plus the elimination of an equivalent number of young stock for replacements, thereby lowering costs and releasing acres for other uses.

Before culling it is necessary to compare the production of a cow with the rest of the herd. This is done by putting the records on a 305 day mature equivalent basis (that is, making allowance for age). Make sure that the records compared were made during the same year because of the wide variation from year to year in environmental conditions.

You must also compare the cow's record with animals which made their records under the same conditions. This you can do by dividing the year into two seasonal parts — March through August, which would include the spring and summer fresheners and September through February which would include the fall and winter fresheners. This is necessary because of the fact that spring freshening cows produce 800 to 1200 pounds of milk less on the average than cows freshening in the fall. This fact is important also because they produce their maximum at a time when milk prices are lower.

If you do not have records, you can only guess at her producing ability relative to other cows in the herd. A cow produces about one half of her total 305 day record in the first four months. This fact can be used to help judge a cow before she completes a record. If she makes only 130 pounds of fat in four months, she will have only about 260 pounds in her entire lacta-

Reprinted from American Agriculturist, Ithaca, New York

tion, and this would surely indicate culling.

A first calf heifer that produces thirty per cent below your herd average is probably not worth keeping. It will generally cost you money to give her a second chance.

There is always some gamble involved in predicting the future production of a cow. It is necessary, however, to do this and several factors must be considered. From the disease standpoint, not only the production of the cow is concerned but also the rest of the herd. A cow which is positive to the Bang's test or one with a history of mastitis should be high on the culling list. The age of the cow is a factor, in addition to her past breeding record. Old cows have fewer remaining productive years and are more subject to misfortune in general.

The length of the current expected dry period should be considered. The most profitable length of dry period is about two months. Each additional month a cow is dry means additional costs without any return. How good a cow is, plus all the other factors considered, will determine whether she should be culled. A large number of cows will be dry four months, but relatively few for as long as six to eight months. Sometimes it may be better to keep a good cow dry six months than to sell her or buy a replacement.

The number of available replacements may sometimes influence a decision. Limited barn space and several fresh heifers often make decisions easier.

The milking qualities of a cow may be a factor. There is evidence that slow milking cows are a hinderance to labor efficiency.

The price of beef must be considered . Usually the price of cull cows is highest in the spring and lowest in the fall.

If a cow is producing at a below average rate and will be dry a long time, it probably will pay to cull her.

The "check off" sheet may be a help in deciding which cows to cull.

18 Point Guide For Culling

Check the following statements "yes" or "no"' for the cows under consideration*

1. If she is a first calf heifer did she produce thirty per cent below your herd average?
   Yes _____ No _____
2. In the first four months of her lactation has she produced less than 130 pounds of butterfat?
   Yes _____ No _____
3. Is her 305 day M.E. lactation record below the average of herd mates freshening during the same year and season? (Divide the herd into two seasons of freshening—March through August—September through February.)
   Yes _____ No _____
4. Will she be dry more than 6

months or more?
Yes _____ No _____

5. Is there a replacement heifer available?
Yes _____ No _____

6. Is she an old cow?
Yes _____ No _____

7. Does she have a record of mastitis?
Yes _____ No _____

8. Is she positive to Bang's disease test?
Yes _____ No _____

9. Does she have a record of breeding trouble?
Yes _____ No _____

10. Did she have complications after her last calving?
Yes _____ No _____

11. Does she have a record of milk fever or Ketosis?
Yes _____ No _____

12. Is space needed for fresh heifers?
Yes _____ No _____

13. Is the price of beef average to good?
Yes _____ No _____

14. Is she a spring freshener?
Yes _____ No _____

15. Is she below the average type of your herd?
Yes _____ No _____

16. Is she a slow milker?
Yes _____ No _____

17. Will it pay you to replace this cow with a higher producer?
Yes _____ No _____

18. Will it pay you to remove this cow without replacing her?
Yes _____ No _____

*If the question is checked "yes", it indicates culling; "yes" answers to questions 1, 2, 3, 4, 7, 8, 9, 17 and 18 are strong indications that the cow should be culled; if several cows are being considered for culling, check-off each cow and compare.

Farm Repair Shop Saves Big Repair Bills

"Do-it-yourself" can mean a big money saving when it comes to repairing farm machinery. And a heated, well-equipped farm shop makes home machinery repairing a lot easier, says Lynn Brooks, University of Wisconsin farm engineer.

He gives three good reasons for having a heated farm shop. First, machinery can be repaired and checked during winter. Second, a good shop will make it easier and quicker to service and repair equipment during the planting and harvesting seasons. Third, a shop makes it handy to build all the gates, shelves, and odds and ends needed around the house and barn.

Brooks says a shop 30 feet square is large enough for most farms, and a 16 x 26 foot shop will take care of most small farms. A larger one can also be used to house a tractor or small truck.

Wisconsin Extension

Farrowing Time Management

A little extra care at farrowing time means extra profits for the hog raiser . . .

Condensed from
The American Hampshire Herdsman

Gerald C. Anderson, University of West Virginia

A SOW must raise at least five pigs to pay her way!

Profits from the swine enterprise may be largely determined by the care and feeding that a brood sow receives before and after she farrows. Carelessness and a lack of attention to important practices will usually result in a high death rate in the litter and accordingly small litters weaned. With poor feeding and care the chances of a sow returning a profit are small. The following suggestions have been tested and will help improve pork production.

The quarters provided for the sow at farrowing time should be reasonably warm, dry, free of drafts, and easy to clean. Such pens should be prepared several days before the sow is due to farrow. Guard rails offer the baby pig a great deal of protection and will prevent a considerable loss of pigs from overlaying by the sow. They are commonly placed about eight to ten inches from all walls and about eight inches from the floor. In addition, it is often advisable to section one or two corners of a pen with 2" x 4"s to provide a space for a brooder and a creep for the pigs.

Before the sow is placed in the farrowing pen the walls and floor should be thoroughly scrubbed with a solution of one pound of lye in thirty gallons of boiling hot water. This removes any hardened filth and does a great deal towards killing parasite eggs and harmful germs. After scrubbing the pen with hot lye water a complete spraying or scrubbing with a reliable disinfectant such as a good coal tar dip should follow.

The sow should be removed from the rest of the herd three or four days before she is due to farrow. This gives her time to become acquainted with her new surroundings and to the presence of the herdsman. Accordingly she will be less restless and more

Reprinted by permission from The American Hampshire Herdsman, Peoria, Ill.

easily handled at farrowing time.

Before placing the sow in the farrowing quarters, her sides, underline, feet and legs should be thoroughly washed with soap and warm water to remove dirt and filth in which worm eggs may be present. This simple precaution will help prevent the pigs from becoming infested with parasites early in life, the effects of which cannot later be overcome with worm treatments.

The amount of bedding given to the sow should be moderate—a light covering on the floor will suffice. Often the tendency is to be too liberal with the bedding, when actually such a practice is dangerous. With large amounts of bedding available a sow tends to work it into one large pile. This may serve as a trap for the small pig, holding him out of sight until his mother unwittingly squeezes him to death. The pig often finds his dinner out of reach, perched atop a stack of straw! Experience has shown that enough bedding to keep the pen dry is best. The kind of bedding is not so important as long as it is dry and fine.

Keeping a pen dry requires some attention, but usually the regular removal of soiled, damp bedding and replacing it with clean, dry material will do the job. Dryness, next to warmth is a must for the survival of the newly born pig.

Since for some time after birth the pig is unable to keep himself warm if the temperature is below approximately 40° F., a source of artificial heat must be supplied. If this is not done the small pig will become chilled, lose his desire to nurse, become weak and die. Also, when small pigs become cold they pile up, oftentimes over the warm spot left by the sow, or near to their mothers, and as a consequence many pigs are overlaid.

A simple brooder will supply an economical source of warmth and will be a big asset in raising large litters. A brooder should be roomy and should not produce too much heat, i.e. about 65 to 70°. With the more elaborate brooders the temperature may be easily regulated by adjusting the thermostat, while with other brooders a raising or lowering of the heat bulb will serve as an adjustment. All good brooders should have a source of light at all times to attract the pigs. Usually by the time the pigs are three or four weeks old, depending of course on weather conditions, the brooder may be removed.

It is highly important that the ration of the sow be carefully regulated in the days immediately prior to farrowing. The amount of feed should usually be reduced, and care should be taken to supply a ration which is

mildly laxative. Large amounts of feed, especially a heavy concentrated ration, tends to stimulate milk flow before the pigs have arrived. Overfeeding may result in congested and inflamed udders. For easiest farrowing and for a rapid recovery a sow's digestive tract should not be loaded with waste material. A good way to accomplish these objectives is to cut the regular grain ration in half and make the other half (by measure) wheat bran. Such bulky feeds as oats or wheat shorts may also be used. Some sows will demand more feed than others to keep them satisfied and quiet, but usually one quart of the half bran, half regular ration mixture fed twice daily will be adequate during the three, or four days before the pigs are due.

Many pigs may be saved if someone is present when the sow is farrowing. This is especially true if the weather is severe or the sow is experiencing difficulty. The presence of an attendant at this time often means the difference between success and failure. Most important of all is to be sure that each pig gets free of the membranes that surround it at birth and that the nose and mouth are cleared of fluid so that breathing is not blocked. Each pig should be helped to a good feeding of the first milk. This is especially important if the pigs are small and weak.

Soon after birth the navel should be thoroughly disinfected. A tincture of iodine solution is suitable. This practice will prevent an infection from becoming established and will do much in keeping the pigs healthy and well-doing. A small bottle with a wide mouth may be used. Place the cord in the bottle and hold it against the pig's belly for a minute or so. If the cord is long it should be clipped off about six inches from the body before being disinfected.

The small, sharp needle, or wolf teeth should be clipped soon after birth. The teeth should be cut off evenly so that no rough edges or pieces will be left. Care should be exercised so as not to injure the gum. The pig has no use for these teeth and if they are not removed they may interfere with his suckling, and will often injure the sow's udder leaving an open pathway for infection.

As a means of identification, each pig should be ear marked and his number recorded. Later, this identification is valuable in selecting gilts for replacement purposes. In all cases care should be taken in locating the marks, and they should be put in so as to be clear and easily read.

During the first twenty-four hours following farrowing the sow will usually not need any

feed, but should have all the water she desires. If, however, she is restless at feeding time it may be wise to offer her a small amount of whole oats or similar bulky ground feed, fed as a thin slop. The promptness of the sow's recovery from farrowing and the success with which she comes into milk will largely depend upon her feeding during the first week. She should receive a bulky laxative ration. A ration similar to that fed prior to farrowing with the inclusion of bran as suggested is satisfactory. Beginning with the second day following farrowing the sow may be fed about one double handful of feed at each feeding (about one half pound). By the fourth day this may be increased to twice this amount, or one pound, and on the sixth day to one and a half pounds at each feeding. Beginning with the second week the ration should be increased at the rate of one half to one pound daily until the sow is on full feed. During this time the amount of bran may be gradually reduced. The herdsman who knows each sow well can regulate her feed to the best advantage during these early weeks after farrowing. Common sense must always be used.

Too much haste in bringing the sow to full feed may over stimulate milk flow. Ordinarily the pigs are best able to use large amounts of milk after they are two to three weeks old. In many instances, if the sow is brought up to her full milk producing capacity before this time the pigs will develop scours. Usually this digestive disturbance results in a loss of appetite and often a setback in the growth of the pigs. As a result the sow's udder may become congested and inflamed and prevent her from producing a maximum amount of milk later on when the pigs can use it to best advantage.

Since pigs are born with very little iron and copper in their bodies and sow's milk is low in these two minerals which are necessary for the prevention of anemia, the suckling pig must have his milk supplemented with these minerals if he is to thrive. One may accomplish this by painting the sow's udder twice daily with a solution of iron and copper. A mixture commonly used is made up of five ounces of iron sulphate and one ounce of copper sulfate dissolved in one quart of water. One may also accomplish this purpose by placing small amounts of clean earth in the corner of the pen. The earth should be taken from an area where hogs have not been for at least three years in order to avoid contaminating the pigs with parasite eggs. Sometimes the iron and copper solution is sprinkled lightly over the earth.

In any case one should begin using one of these methods at least by the time the pigs are a week old and should continue to do so until the sow and pigs are placed on pasture, or the pigs are eating considerable amounts of the creep ration.

After the pigs are three to four weeks old they will begin to eat small amounts of solid feed. Under most systems of sow and litter management a creep should be provided for the pigs. The creep ration should be highly nutritious since the pig will consume only small amounts of feed. A supplement made up of tankage 2 parts, soybean oil meal 1 part, and alfalfa meal 1 part, self fed with whole shelled corn is suggested as a creep ration for pigs in dry lot. If the pigs are on lush green pasture, the alfalfa meal may be left out. If skim milk or other good quality dairy by-product is available, it may be fed along with whole shelled corn or similar grain with good results.

The best time to castrate and vaccinate the pigs is a subject about which there is considerable argument. Both should be done before the pigs are weaned, but not at the same time. The author prefers to castrate not later than two weeks of age and then vaccinate after the wounds have healed, usually between the fifth and sixth weeks so that the pigs will have recovered and be doing well before they are weaned at eight weeks.

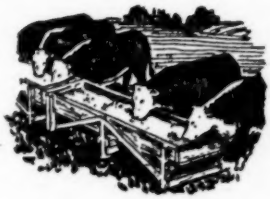
Dehorn Calves While Young

Why keep horns on dairy cattle—unless you're keeping them for show animals? Dehorn your cattle and you lessen the problem of the "boss cow" and reduce goring losses. Dehorned cattle are also easier to handle, especially in stanchions.

Dehorning is best done when the calves are less than 3 months old. When mature animals are dehorned, they may lose weight, drop in production, and get infected. Dehorning older cows also leaves an unattractive stub.

An easy way to dehorn is with an electric calf dehorner, says I. W. Slater, extension dairyman at the University of Wyoming. To use an electric dehorner, press the cup of the heated iron over the horn button; rotate the iron to give firm contact with the button. The button will drop off in a month or so, leaving a smooth, healed surface. *University of Wyoming*

How One Man Feeds 2500 Steers



A bank president has built an efficient and profitable ranch . . .

Condensed from Utah Farmer

David H. Mann

WHAT is said by experts to be one of the most efficient and profitable beef feeding setups in Utah is operated by a bank president, P. P. Thomas.

Thomas has been in the banking business at Spanish Fork for all of 50 years, and has been engaged in livestock raising for half of that time.

Mr. Thomas, in his position as bank president, does business with a lot of ranchers. He hears the hard luck stories and the success stories; he knows how livestockmen operate and how they both lose money and make money. This is a decided advantage to a banker who is also in the livestock business; he can avoid some of the pitfalls as well as take advantage of proven practices.

A year ago he decided, after some investigation in near-by states of livestock feeding practices, that with the right setup one man could feed 2500 head of feed lot cattle. One man is doing just that in the Thomas feed yards at the Elberta ranch.

The Thomas feed yard is divided into five corrals ideally situated on the southern slope of a broad, dry, gently sloping sandy hill. It has one major feed manger, 1100 feet long, that accommodates 1500 head of cattle at one feeding. Also, another 1000 head can be fed in the field adjacent to the yards, or 2500 head all told.

How to feed 2500 steers within a matter of minutes was a problem Thomas worked out last winter. In Arizona he found just what he needed: A custom-built, all metal feed mixing box mounted on a truck chassis. It has a capacity of five tons, including beet molasses in a tank that is kept warm by the exhaust from the truck motor.

First step in the feeding procedure is to fork chopped alfalfa or silage into the box with a tractor-mounted loader. Then

Reprinted by permission from Utah Farmer, Salt Lake City, Utah

rolled barley and cottonseed meal is dumped in by gravity from overhead bins, and the molasses tank filled. All this takes around five minutes.

The mixing is done next, while the truck is on its way to the corrals. Mounted at the front end of the box are three rotating mixer shafts, driven by power takeoff. They push the feed to the top of the load at the same time that a moving chain on the bottom of the box continually forces it into the mixing spindles. By the time the load has reached the 1100-foot long manger, the feed is pretty well mixed. Then the driver turns on the unloading auger and the molasses valve, and drives slowly along the manger. The auger feeds the well-mixed forage into the truck's distributing trough, where the molasses drips into and mixes with the ration just before it drops into the manger.

The truck requires about 10 minutes to travel the 1100 feet and fill the manger.

The series of chopped hay stacks, which are put up with portable frames, are adjacent to the corrals. An underground concrete storage tank holds 60 tons of molasses, which is put in storage during hot weather. The southern exposure of the underground tank, plus about two feet of soil over the top, helps to retain the summer warmth. However, an electric heating arrangement can be used, should the molasses become too thick to be readily pumped out during the winter. Molasses is added to the forage at a rate of three pounds to each 100 pounds of forage.

The ranch has 600 acres of ranger and buffalo alfalfa, all of which is chopped, either dry or for alfalfa silage. Since Thomas raises more alfalfa than he can feed, he sells the excess.

The alfalfa fields are leveled to the contour of the land and easily irrigated. Thomas prefers field chopped dry alfalfa to baled since it takes less labor to harvest it, stack it, load it in the mixing truck and to feed it. And then again, all of it is consumed —there are no dry stems left in the manger. In October, he had 2000 tons of chopped hay ready for feeding. He sprays for insect control and his third crop goes to silage.

Thomas' big trench silo, dug last spring, is 300 feet long, 30 feet wide and 20 feet deep. Built into a gently sloping hillside of dry sandy clay loam, the pit was unlined, except the top edges which were protected from crumbling with baled straw.

In October, a thousand tons of corn silage had already been placed in the silo and in addition, some 2000 tons of alfalfa silage was being tramped down

on top of the corn silage with a big crawler tractor. When filled with 3000 tons of silage, Thomas planned to field-harvest and crop a heavy growth of Tall wheatgrass, from a 100-acre plot and place on top of the pit.

The silo, the grain bins, the molasses tank and the chopped hay stacks and scales are all situated as near as possible to the central point. Every load of silage was weighed, and, in addition, all of the chopped hay had been weighed. When feeding operations start on a big scale along about Christmas, the feeder cattle will be weighed in, all forage weighed, and when finished, the cattle will be weighed out. In other words, Thomas guesses at nothing; he knows his gains, his forage consumption and all of his costs.

The middle of October, Thomas was bringing some 400 head of Hereford cows, plus an 85-per cent calf crop, from the high ranges to the ranch. He keeps enough purebred Hereford cows to raise what bulls he needs. He will move these cows and calves onto the ranch where they will range on the alfalfa fields until about Christmas, when they will be moved into the feed yards during January and February, and then out onto the fields again and then onto the high ranges.

He feeds out his calves and in addition, buys up feeder stock and feeds the year around. While he is partial to Herefords, he has some registered Angus cows and in October he had several hundred head of Hereford and Angus heifers and steers in the feed lot. As fast as they are finished, they are picked up by the buyers from well known Utah packing plants near Salt Lake City.

Fewer Laborers, Higher Wages Longtime Outlook on Farms

The oft-time headline "Farm Employment Lower—Farm Wage Rates Higher," is an apt summary for the farm labor outlook for the next several years, believe agricultural economists.

They point out that industrial development continues to move forward rapidly, and each new industry brings a demand for labor to be drawn primarily from the rural areas. Farmers will have to compete with this industrial development for their hired labor supply.

Virginia Extension

MORE ABOUT MULTIFLORA

Soil Conservation Service
Room 25, Agronomy Building
Ames, Iowa

Editor, Farmer's Digest
Fort Atkinson, Wisconsin

In the October 1955 issue of Farmer's Digest, there is a letter from a contributor from Missouri concerning the spreading of multiflora rose. From this letter it appears multiflora rose is spreading rather rapidly in Missouri and that there is no known method of eradication. Along this line, I would refer you to the article below —in the Journal of Soil and Water Conservation of March 1955—

"An evaluation in the Northeastern States of 173 plantings of multiflora rose five or more years old was made in 1952 and 1953. Also, 18 reports of the spread of rose from old nurseries or ornamental plants were checked.

The evaluation revealed that there was no significant spreading on cropland or in well-managed pasture. Spreading was observed to idle and unmanaged areas, some unmowable pastures, and fence rows near seed-producing plants.

A site was selected in Chester County, Pennsylvania for trials on methods of eradicating escaped plants of multiflora rose. The escaped plants flourished in areas where there had not been adequate pasture management, chiefly mowing. Well managed pastures were entirely free of multiflora rose.

Four weed-control chemicals were used, namely, 2, 4, 5-T and 2, 4-D brush spray, 2, 4-D Amine weed spray, 2, 4-D ester weed spray, and Ammate. The chemicals were applied both as dormant sprays and as foliage sprays. Notes were taken on percentage kill and regrowth shortly after spraying and about one year late. "Brush Killer" (2, 4, 5-T and 2, 4-D) was the most effective chemical tested.

The authors recommend either a dormant or foliage spray of a "Brush Killer" mixture of isopropyl esters of 2, 4, 5-T and 2, 4-D (13% and 27% respectively) for the eradication of multiflora rose. The dormant spray is one part "Brush Killer" to 25 or 30 parts of kerosene or fuel oil. The foliage spray is one part "Brush Killer" to 100 or 125 parts of water and 5 gallons of fuel oil."

Very truly yours,
Virgil B. Hawk
Plant Materials Technician

Band Seeding Pays Big

Band seeding of legumes and grasses has become an accepted practice on many farms. 10 to 20 acres can pay for altering your drill . . .

Condensed from Michigan Farmer

M. B. Tesar
Michigan State College

YOU can pay for the cost of converting your drill into a band seeder if you seed from 10 to 20 acres of alfalfa or red clover in grain. With alfalfa and red clover at 70 cents per pound, you can save $1.40 per acre by reducing the seed rate from 8 to 6 pounds per acre.

Experiments at Michigan State show you can save an average of one fourth in seed cost—and have stronger and surer stands—than if you broadcast your seed with a drill. Since a band seeder attachment should last from 5 to 10 years, savings on seed and better stands in the future will mean more net profit on your farm.

How It Works

The legume seed is dropped in a narrow band—12 inches behind the drill shoe—on top the soil. It is directly over the fertilizer and grain drilled from one to 2½ inches deep. The drill disk furrow closes before the seed falls on the ground. Cultipacking after seeding or the covering effect of rains cover the seed shallowly.

Band seeding gives stronger stands with less seed since the phosphorus in the fertilizer under the seed gives the small seedling a "shot in the arm" for a quick start. The small plants have a better chance to survive grain competition, insects, weeds, diseases and drought.

Make It or Buy It

Kits are now being manufactured by implement and specialty companies which use rubber hose or flexible metal tubing or both to adapt a regular grain drill into a band seeder. Prices vary from about $1.10 to $2.30 per

disk of the drill, or from $15 to $30 for a 13-hole drill.

Farmers with a tool shop and some extra time can make their own band seeder. Metal tubing can be used in this adaptation but rubber hose can be used just as satisfactorily provided it is kept aligned over the fertilizer. Strap irons and bolts are much better than baling wire in doing this job.

Any adaptation must permit the normal raising and lowering of the disks without damage to the tubes when going over rough ground. If you plan to make your own band seeder, here are the important points to observe:

1. Legume seed should fall at least 12 inches behind the fertilizer outlet to be sure it is on top the ground—not covered.

2. The ends of the legume seed tubes should be 2 to 3 inches above the soil to keep the seed in a narrow band over the fertilizer. Seed scatters too much if the seed tubes are more than 3 to 4 inches above the soil.

3. Remove covering chains since they scatter the seed too much.

If you plan to make your own band seeding attachments rather than buying them, you can get more information from your County Agent.

If you want to purchase a ready made band seeding set, write to Farmer's Digest. We will see that prices and information are mailed to you.

How Much Nectar in Acre of Clover?

How much nectar is in an acre of clover?

This question is often pondered by beekeepers. Recently the answer was obtained at Louisiana State University, reports J. M. Amos, bee specialist. The average white clover head or flower yields slightly more than 8/millionths of a quart of nectar a day. White sweet clover (Hubam) averaged less than 1/10 as much nectar, and hairy vetch yielded about 10 times as much as did sweet clover.

Though temperature, moisture, and blossoms cause variation, workers estimate that an average acre of white clover would yield from ¼ to nearly 1½ quarts of nectar a day. There are more sweet clover blossoms per acre, hence the larger volume of nectar from this source than from white clover, which gives more nectar per head.

The nectar was taken from the flowers in the morning and afternoons from caged plants. It was removed from the flowers by centrifugal force at 40 times that of gravity. Nectar is a natural resource, which if not collected by honeybees, is lost.

Is Your Lease A Lemon?

These new, farm-tested leasing ideas may help answer who should pay for fertilizer, weed killers and repairs . . .

Condensed from Farm Journal

Dick Braun

SOME live-wire farmers, farm managers, and economists are over-hauling leases—to keep up with changes in farming.

Leases can get out of whack; no longer be fair to both parties. This happens, as Ohio economist Russ Moore points out, when wages and machine-farming expenses scoot up faster than land values. Or when leases don't change with new ways of cropping, soil conservation, and fertilizing—and when the importance of farm buildings shifts.

Here are some of the new leasing ideas. Some of them might work in your community, or on your farm:

● Fertilizer clauses are changing the most.

"Soil fertility belongs to the owner. The tenant should pay only for what he uses," says C. M. Johnson, Illinois farm manager.

Except for nitrogen, unused fertilizer builds up soil fertility, carries over to the next year. If a tenant moves, he loses his share of that unused fertility.

So Johnson recommends charging tenants only for the fertilizer used by their share of the *marketed* product.

They figure a ton of alfalfa uses about 11.7 pounds of phosphorus, 32 pounds of potassium; ten bushels of corn take 3.6 pounds of P and 2.4 of K; 1,000 pounds of beef pull out 18.1 pounds of P and 2.4 pounds of K. They give all crops and meat products a fertilizer requirement standard. Tenant and landlord split the nitrogen cost 50-50.

At the end of the year, they add up the tenant's share of the P and K *actually used* by his part of the crop.

"Both tenants and owners like this way of doing business," says Johnson.

Joe Laycock, a tenant in Green County, Ohio, has all his fertilizer furnished. In return, Laycock stands the expense of all machinery, harvesting, and mar-

Reprinted by permission from Farm Journal, Philadelphia, Pennsylvania

keting. He's on a crop-and-livestock share lease.

"Best lease I ever had," says Laycock. "Already have my money wrapped up in machinery, so taking the landlord's share of that doesn't pinch. Now there's no fertilizer bill to worry about."

The manager of this farm, Floyd Madden, says that some owners like this kind of lease because they can build up soil fertility as they want to, without being handicapped by the tenant's lack of capital.

Says Madden: "We've checked farm leases for 10 years, found that machinery and low-application fertilizer costs are about equal. Put on heavy doses of fertilizer, and the tenant should pay for half the nitrogen."

● Who pays for insecticides and weed killers, once plants are up?

John Walley, Indiana farm manager, says this: "Split the cost of the chemicals for pest control the same way as crops are divided, but let the tenant pay for weed chemicals. That's natural because ordinarily, the tenant controls weeds with his machinery.

● What about repairs to buildings and fences?

Some northwestern Ohio owners are *selling off their improvements* and saving a lot of expense. Why?

"Because *unimproved land* in that area rents for the same as farms *with buildings*," says Walley. Mechanization allows you to take on more land.

Another reason: There's less cash pasture rent income as farmers change to more grain in the rotation, with the help of fertilizer. So owners often sell or neglect the buildings. Either way, the home-hunting tenant is hurt.

To lick this problem, some tenants pay cash rent for the buildings.

The Stroop Agricultural Company in Ohio is considering charging cash rent for dead-investment buildings like the house, garage, and machine shed. Then owners would pay the renter an hourly wage for repair work on buildings and fences.

This would keep the improvements in tip-top shape, and renters would live on well-kept farms.

Soil Improvement Practices

Most folks agree that the landlord should foot the bill for tiling, terracing, surface drainage, and lime.

On farms managed by George Slater, Hamilton County, Ind., the owners also buy clover and grass seed and lime, and keep ACP payments. The new meadow seeding belongs to the owner until haying, when they split

crops as usual. There's no settlement necessary if the tenant moves. The tenant, in turn, stands the haying expense.

"There's less trouble when one party pays *all* of some expenses, and the other party *all* of others," says Slater.

Here Are Other Worthwhile Ideas

● Condor Farm Management, in Indiana, asks their landlords and tenants to sign a new lease each year. The lease carries a farm map showing each field. Before signing, the renter and owner *write in each field* the kind and amount of fertilizer and seed to use.

This takes out the guesswork and equalizes the blame for a poor crop.

● Set aside a certain day each month for collections, suggests Michigan economist E. B. Hill. This will keep collections orderly —and they won't come unexpectedly when a tenant is knee-deep in work. You can plan your work and be ready with the figures.

● Ever wonder what kind of leases you'll be signing in 1965, or 1975? The answer that C. M. Johnson suggests is something to think about.

He's thinking strongly about having the owner furnish everything, including livestock and machinery. The tenant would get a percentage of the net income, above a guaranteed yearly payment. The tenant's share in the net income would be a bonus for his efficiency and management.

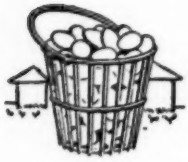
Owners of good farms would invest the necessary capital to fertilize and operate those farms in the best, most modern way possible. And they'd hire a tenant who could do it.

Expenditures for fertilizer compete with expenditures for other farm enterprises. Return per dollar spent should guide the spending of money for fertilizer or for other purposes.

That kind of a setup might be just the checker to help young farmers get started. It wouldn't work for the owner with limited capital, though. Or the penny-pincher who milks every dollar possible out of a farm.

Right now the big job is for our present leases to catch up with our fast-changing agriculture.

Can You Meet These Egg Production Standards?



If you are to realize good profits from your flock it is important to know whether you are running well above the average in rate of lay, feed efficiency, mortality and low labor costs . . .

Condensed from Poultry Tribune

Frank Reed

• PRODUCTION standards serve a useful purpose as yardsticks for measuring the efficiency of the poultry enterprise and in pinpointing weaknesses.

In setting up standards there is always the problem of whether you should use average figures, above average figures, or the very highest results which have been attained.

My own reasoning on the subject would eliminate average figures as being mediocre, and I would not use the very highest figures because they are exceptional. This leaves us with standards which are above average; and the question is—how much above average?

It is probable that if the task were turned over to a dozen well qualified authorities, there would result a dozen different standards. But the figures arrived at, I expect, would not be too far apart.

What are the standards of efficiency which a good operator of a table egg flock can reasonably expect to attain?

60 Per Cent Egg Production

Producers of table eggs should average at least 60 per cent production on a hen-day basis the year around. That's 216 eggs or better per bird per year.

1. **At least 60% production on a hen-day basis the year around.**
2. **Feed efficiency of 5.0 for Leghorn-type birds—5.5 for heavy breeds.**
3. **Low mortailty (15%).**
4. **2,500 layers per man.**
5. **Maximum use (80%) of buildings and equipment.**

To attain this rate of lay requires a production rate in the

Reprinted by permission from Poultry Tribune, Mt. Morris, Illinois

vicinity of 75 per cent the first quarter of the laying year; 65 per cent the second quarter; 55 per cent the third; and 45 per cent the last quarter.

Furthermore, this production should be attained with practically no culling during the first eight months of production. The majority of birds should be kept close to a full 12 months of lay.

Stock capable of this sort of performance is available today, and it is likely that you will not need to look far to find it. Getting the full potential out of such stock is your job in care and feeding. All-pullet flocks are recommended for maximum rate of lay.

Rate of lay has a tremendous influence on profits. A difference of 5 per cent in the average rate of lay means 1½ dozen eggs per bird per year—worth 60 to 70 cents.

Feed Efficiency of 5.0

The term "feed conversion," meaning pounds of feed to produce a dozen eggs, may soon become as familiar to producers of eggs as it is already to broiler growers.

An acceptable average feed conversion figure is 5.0 pounds of feed to produce a dozen eggs with Leghorns; or 5.5 pounds for the heavy breeds.

Rate of Lay Affects Efficiency

Feed conversion, of course, goes up and down with the rate of lay, but there are others factors which influence it. The body weight of the bird is one. Roughly, you can figure that for every additional pound of body weight beyond 4½ pounds, an extra 2 pounds of feed daily per 100 birds will be required. A flock averaging 6½ pounds in body weight will require from ½ to ¾ lb. more feed to produce a dozen eggs than a flock weighing 4½ pounds.

Kind of Feed Makes a Difference

The makeup of the feed you are using also affects efficiency. With the new high efficiency, low fiber rations, sometimes termed "high energy rations," birds will eat less feed at any given rate of lay. A 4 per cent fiber ration will give approximately 15 per cent better efficiency than a ration of equal nutritional quality containing 7 per cent fiber.

Feed wastage is another factor affecting feed efficiency. Are your hoppers properly designed to prevent "billing out" of feed? Do you sometimes fill them too full? How many rats are you supporting?

Low Mortality

Mortality losses, including birds culled out and destroyed because of disease, should not exceed 15 per cent over a full 12-month period in the laying house. This is an average of about 1 to 1½ per cent per month—although mortality losses are seldom dis-

tributed evenly.

While inheritance or breeding plays a definite role in mortality losses, the person who always blames the stock is kidding himself. Raising the young stock in isolation and good management are important, including precautions to control cannibalism, and proper immunization for those diseases for which vaccination programs are available.

There has been some overemphasis on this factor of birds per man. The goal is not to see how many birds one man can handle, but rather to reduce the labor cost of producing a dozen eggs. Anyone can increase his birds per man by merely putting in more birds and giving them less care—which, of course, is pure folly.

A reasonable standard of layers per man is about 2,500 birds housed (or an average for the year of 2,000). This includes all the work on the poultry farm including raising of replacements, handling and packing eggs, and the other odd jobs.

The problem is to increase birds per man, without sacrificing good care and attention to details. The use of labor saving equipment, larger poultry houses, and better organization of chore work are among the desirable methods of increasing birds per man.

Capacity Use of Buildings

In any business, capacity operation of plant and equipment is fundamental for maximum earnings. The goal should be something more than 80 per cent of capacity for the year. In other words, all buildings, including brooding facilities, should be in full use at least 80 per cent of the time.

A careful planning of the production schedule including dates chicks are started, housing schedule, and disposal dates, is necessary to obtain capacity operation.

Records Provide the Answers

How does your flock "measure up" to these standards? Obviously, you must have accurate records in order to really know. Do you have figures on number of layers and egg production by months? Do you know exactly your mortality losses? Have you ever figured feed efficiency? Record keeping is important.

Attaining the production standards listed here is cause for satisfaction but not for complacency. For one has but to look at the record to realize how extremely rapid has been the improvement in technological efficiency of the poultry industry. Table egg producers need to remember that the best of today will be the standard of tomorrow.

Mulching Small Fruits

Recent research proves the value of mulches for raspberries and blueberries, and grapes . . .

Condensed from Ohio Farm and Home Research

R. G. Hill, Jr. and *J. M. Beattie*

IT IS commonly known that a mulch system of soil management with tree fruits will result in higher yields, larger fruits, and improved tree condition.

Likewise, strawberry growers have long recognized that a mulch applied during the spring of the fruiting year to standard June-bearing varieties is beneficial. It was the adoption of the sawdust mulch system of culture that made the production of everbearing strawberries practical.

Growers of other small fruits, however, have generally avoided mulching, and instead follow the practice of keeping their plantings at least partially under cultivation.

During the past several years, the Ohio Station has conducted studies on the value of a mulch system of soil management with such fruits as grapes, red raspberries and blueberries. In these tests we have compared growth and yield of these crops under both soil management plans—mulch and cultivation with clover crops.

Grapes

Concord grapes have been grown under heavy straw mulch and under cultivation plus overwintering cover crops for the past seven years. The mulch was applied initially at about 10 tons per acre in the fall of 1946. It was replenished annually at about 6 tons per acre so as to maintain a layer of straw 8-10 inches thick over the entire vineyard floor. From 1947 through 1953 the mulched vines have outyielded the cultivated vines by an average of 1.2 tons per acre per year, or 25 per cent increase. This was accomplished with an application of 40 lbs. per acre per year of actual nitrogen to the mulched vines.

Foliage of the mulched vines contained more nitrogen, phosphorus, potassium, manganese, and copper and lower quantities

Reprinted from Ohio Farm and Home Research, Ohio Agricultural Experiment Station, Wooster, Ohio

of magnesium and calcium than that from cultivated vines.

Mulching has resulted in slightly lower sugar content of the fruit, but this can apparently be overcome by allowing the fruit to remain on the vines about a week or ten days longer than in the case of cultivated vines.

Red Raspberries

In the fall of 1950, comparable areas in a 2 year old Latham red raspberry planting were selected for these soil management studies. At that time the areas to be used in the evaluation of the mulch system were completely covered with eight inches of wheat straw in both the row and aisle areas alike. (A ton of straw equals approximately one acre inch of mulch.) Each succeeding fall mulch has been added in these plots at the rate of approximately five tons per acre. The other areas were maintained under conventional soil management practices with winter cover crops of rye and summer cover crops of soybeans. Both areas have been fertilized with annual spring applications of 50 pounds of actual nitrogen per acre, applied as either 220 pounds of ammonium sulfate or as 150 pounds of ammonium nitrate.

The yield of the raspberry plants grown under mulch was markedly greater in the 1951, 1952 and 1953 seasons than that from plants grown under the conventional system. This yield response was not noted in 1954 because of injury during the 1953-54 winter that resulted in reduced cane stand. Yield data for the four seasons, in spite of the injury which affected the 1954 crop, showed that the mulched plants produced 10 per cent more fruit than did the cultivated plants.

Mulching was also found to increase berry size. Berries from the mulched plants were 10 per cent larger than those from the cultivated plants. This increase in berry size did not entirely account for the greater yield. For example, in the 1952 season the mulch plots produced a 23 per cent greater yield while the berries were only 11 per cent larger.

Blueberries

A planting of Jersey variety blueberries was made in 1948 in which straw, peat moss and sawdust-mulch were to be compared with clean cultivation as soil management practices for the blueberry. In this planting the row area only was mulched and the aisle areas were kept in cover crops both summer and winter. All plots received uniform application of ammonium sulfate.

The yield data of the 1950 through 1954 seasons have shown that any of the mulches were superior to cultivation as a soil management practice for this bush fruit. These records also

show that there was considerable difference in the various mulching materials. Average yield for all five seasons of the plants maintained under straw mulch was 18.6 per cent greater than that of the plants which were kept clean cultivated. while the yield of the peat moss-mulched and sawdust-mulched plants was greater by 80.9 and 152.2 per cent, respectively. An increase in berry size was also noted where mulch was used.

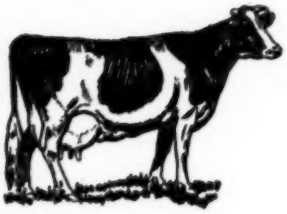
Through the use of the mulch system of soil management the costs of cultivation, seeding of cover crops, and much of the costs of weed control were eliminated. The savings involved here in most seasons would more than off-set the cost of the mulch. In addition to these advantages the hazards of mechanical injury occurring during cultivation were reduced. Mulched plantings were more easily accessible regardless of weather conditions, and picking conditions were greatly improved. No effect upon soil reaction was noted nor was there any increase of insect and disease problems associated with the use of mulch. It should be noted, however, that where mulch is used mice may become a problem and growers should exercise care as mulch can be a fire hazard.

The kinds of mulching materials used in these studies, due to necessity, were limited. Growers, however, need not confine themselves to these materials. Spoiled hay, ground corn cobs, shredded corn stalks or other suitable materials may well be used. With the blueberry, sawdust is preferred. Regardless of the material used, special attention must be given to maintaining the proper nitrogen supply for optimum growth and yield. Because the composition of various mulch materials varies widely, the nitrogen required will vary. The grower then must use the growth and yield responses of the mulched plants as a guide in applying the necessary nitrogen fertilizer.

The oldest living thing on earth is believed to be a tree —a cypress tree—at Rio del Tulle, Mexico. The tree is estimated to be between 5,000 and 7,000 years old.

The major disadvantage of the mulch system of management lies in the scarcity of mulch materials in some areas. Because of this factor, it may be impractical in those areas for the large scale commercial growers to adopt such a system. In most areas, however, some mulching material can be obtained if an effort is made to get it. It appears, therefore, that growers could profitably expend suitable mulching materials.

Can Dairymen Justify Emphasis on Type?



Good type is only indicative of high production . . .

Condensed from
Holstein-Friesian World

Dr. George W. Trimberger

A CONSIDERABLE number of cattle are exhibited at various county, district, state and national shows each year. Many breeders wonder whether the time and effort can be justified. Some go further than this and wonder whether type is important in dairy cattle.

Judging animals is a means of appraising their value and should stress utility values rather than aesthetic values. This means the practical side must be emphasized. Whenever any point of conformation ceases to be of practical value it cannot occupy a major place in selection.

In judging dairy cows, physical structure, or the method of design used in building her, is evaluated the same as we appreciate different designs for houses, cars, planes, ships and many other things. Often some designs are more useful than others for specific purposes. In the dairy cow, dairy quality or character receives major emphasis together with type characteristics to give her wearing qualities. The aim from the practical standpoint is high sustained lifetime production.

Important Characteristics of Type

Dairy character is very important because it indicates that the cow possesses the correct design and physical fitness to fulfill her primary purpose in life—high milk production. Desirable udder conformation is necessary to accomplish this and without a good udder a dairy cow is a miserable failure from the start. None of you will deny the practical importance of these two points which receive so much emphasis in judging.

Body shape with the stress on

Reprinted by permission from Holstein-Friesian World, Laconia, New York

a body with very deep fore and rear ribs which are well sprung to provide as much room as possible for the vital organs and feed storage is extremely important. This influences the roughage handling capacity which is so important for economical and profitable production. Finally to provide the proper support and means of transport for this important and valuable machine the feet and legs on a cow are as important as are the wheels and tires on a car.

Dairy Character

Heavy milk production is largely dependent on a lean, spare framework indicative of a body free from a great amount of fat deposit which interferes with the proper function of the vital organs and the secreting tissue in the udder.

When you observe the individuals with high lifetime production in your own herd, the 100,000 pound milk producers at shows or in private herds, or the cows with a record lifetime production, they invariably will show long, lean necks; open, flat and deep ribs; sharp withers; prominent vertebrae, hips and pin bones, all of which exemplify dairy character. These signs do not always guarantee high production, but they are so characteristic of it and are associated with it so frequently that it places the odds greatly in favor of high production.

In order to provide the means of sustained high production year after year for great lifetime production, strength with dairy quality is necessary. This combination indicates the wearing qualities needed under the terrific strain required for such performance. In a dairy cow this stress and strain between high and mediocre production is comparable to that of driving a car at 40 or at 80 miles an hour. Obviously, it takes a better machine, more dangers are involved and a better driver (caretaker or herdsman) is required for successful high production. This is why type is so important.

A good dairyman knows that a dry cow will take on some extra flesh, but he does not like to see her with patchy fat. He also realizes that young heifers and calves can be ruined by too much feed. This is indicated when fat collects in various places on the body but especially around the vital organs and in the udder to later interfere with the secreting tissue and good udder conformation. In addition to lacking in dairy character, the individuals with short, compact, close coupled bodies have more of a tendency to put on fat which interferes with production.

The high percentage of good udders and particularly udders

with outstanding handling quality or texture that are found on the cows with high production, especially those with state, national and world records, indicates the importance of udder quality for top performance. An udder with a fine texture is a prerequisite for high production. An abundance of fibrous, connective tissue beyond that needed for the framework of the udder indicates a lack of texture with poor secreting and milking qualities. A trained eye can detect the difference, but the physical examination is the best verification of too much connective tissue and impairment of milk secretion.

The efficiency of all other structural and functional parts of conformation of the dairy cow are dependent on a good, useful udder. This is why a firmly attached fore udder and a high, wide, strongly attached rear udder is so important. With this, a level udder floor and the correct teat arrangement will result in good milking qualities.

Correct Body Conformation

There is a right and wrong body shape for desirable dairy type. A cow with a heavy, compact, round body usually indicates that the individual converts a larger comparative amount of feed into body maintenance and fat than do cows with more dairy quality.

A cow with a pinched heart girth, narrow chest, a marked deficiency in the crops, a shallow fore or rear rib, or a very flat body obviously lacks in lung, heart, and feed handling capacity. With such structure the cow does not have the constitution or strength to stand the vigorous requirement for high production year after year.

It is also generally recognized that a cow with a deep fore and rear rib that is well sprung for ample feed capacity can handle more roughage for efficient production. She then has the natural equipment and strength required to produce large quantities of milk with the greatest possible amount of nutrients obtained from the roughage in the ration. The body contributes greatly to the general appearance of an individual which in the final analysis refers to the way all parts are held together to provide wearing qualities.

Feet and Legs

A proper emphasis on legs and feet includes the general structure of bones and muscles to provide a substantial foundation. The object is to have strength but at the same time avoid coarseness at the expense of dairy quality and refinement.

If a dairy cow cannot move easily and smoothly on her feet

and legs, it affects the udder attachment and may also result in udder bruises and blemishes. This is especially true of cows which are narrow at the hocks so the udder is continuously bumped while the cow is in motion.

A foot that is moderately large and well rounded with considerable depth and width at the heel provides a sound foundation and a bearing surface with less foot trouble. Cows that are inclined to have more than the expected foot trouble are less economical because they need more expensive veterinary attention. More dairymen should keep records of the veterinary expense required for each cow in the herd.

Sometimes one hears the statement that cows never leave a herd on account of poor feet and legs. Such a statement is either due to inexperience with a sufficient number of cows, to association with herds of exceptionally good legs, or to a system whereby cows with faulty legs and the trouble caused by these is blamed on some other cause when the cow is sold from the herd.

Good feet and legs are necessary for good grazing habits when cows are on pasture and do frequently influence production efficiency and the net profit from a herd.

In the final analysis the question "Can dairymen justify the emphasis on type?" must be answered emphatically in the affirmative with the provision that they have high production to go with it. This will attain the high lifetime production for which type is so essential.

The judges haven't always had all the answers, but neither have the critics of type and judging. The latter have usually dealt with exceptions and have magnified isolated cases entirely out of proportion to their importance.

Type characteristics which are stressed also frequently have considerable influence on correct management practices. A good example during recent years is the discrimination against fat heifers which later adversely influences udder quality and impairs production.

The emphasis on type is not an academic development at the colleges but is demanded by the breeders of good cattle. In England and some of the European countries, judging is not a part of the curriculum at the colleges. However, the dairymen are more type conscious than we are in America and the livestock men demand emphasis on type.

A type appraisal sheet designed by the men in Animal Husbandry Extension at Cornell stresses as many utility points, such as milking qualities, feeding habits and temperament, as possible. This has found wide use in breed shows and classification programs

involving thousands of dairy cattle each year indicates the importance that practical dairymen attach to type. This is justified because type does exert a tremendous influence on the profit they obtain from high lifetime production which is closely associated with good type.

NO ADDED RAIN FROM CLOUD SEEDING

Science is still hopeful that it can put reality into man's long-nurtured dream to do something about the weather. But Oregon State college meteorologists say much research is needed before such efforts as cloud seeding will give controled weather changes.

They have just completed a four-year study of commercial cloud seeding in Oregon's dairyland wheat area of Sherman, Gilliam, and Morrow counties. Their conclusion: no definite increases in rainfall due to seeding.

The study was made in the 2,642,000 acre Tri-county region where rainmakers have been seeding clouds with silver iodine since 1950. The town of researchers armed themselves with 20-year weather records for the area prior to 1950 before starting their intensive four-year observation.

Average rainfall from 1930 to 1950 has been 10.5 inches during the 10 months, September through June, when cloud seeding is practiced in the Tri-county area. Yearly variations were wide, however, during the 10-month periods: 5.8 inches in 1938 compared to 16.6 inches in 1947.

Reports from regional weather stations, along with actual rainfall measurements in nearby unseeded areas, gave a computed average natural rainfall of slightly under 11 inches for the four test years.

The scientists measured 11 items used to compute natural rainfall, allowed statistical margin of error, and figured 12.60 inches of rain must fall before it could be credited to anything but chance. Actually, only 11.58 inches fell during the seeding season—one inch under the total needed to credit it to anything but nature.

It is quite probable, meteorologists say, that weather conditions are rare when man can make clouds release rain or withhold hail. But they believe the Tri-county study has provided a good tool for measuring present cloud seeding methods.

Oregon State College

Fertilizer . . How Much Can You Afford?

It is important for every farmer to know how heavily he can and should fertilize . . .

Condensed from Crops & Soils

R. H. Blosser, Associate Professor,
Ohio Agricultural Experiment Station

PROFITS from fertilizer depend upon (1) crop production practices used, (2) available capital, and (3) the cost of fertilizer in relation to farm product prices.

A recent Ohio study showed how profits from fertilizer are influenced by the kind of farming practices used. For example, when excellent production practices were used, 800 pounds of fertilizer per acre on corn increased profits $33 above the 200-pound application. But when poor production practices were used, 800 pounds increased net income only $13 above 200 pounds.

Excellent production practices included the best known ways of raising crops. Evidence of poor production practices included low-yielding varieties, late planting, not enough seed used, soil depleting rotations, poor drainage, erosion losses, and inadequate amounts of lime.

Crop yields used in arriving at these figures are estimates of the average response from fertilizer in Ohio. Extension agronomists made these estimates because experimental data are not available for all soil types and cropping practices. Yields for certain soils might vary considerably from these estimates. However, the principles governing the profitable use of fertilizer are the same for all soils.

A study of the yields in the accompanying table shows that each additional amount of fertilizer increases yields by a smaller amount. Also a point can eventually be reached where more fertilizer does not increase yields at all. When extremely heavy applications of fertilizer are made in the customary way, total crop yields may actually decline. However, this situation was not considered because it is never profit-

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able to use that much fertilizer.

The highest possible yields are seldom the most profitable. Even though more fertilizer may give some increase in yields, a point is eventually reached where the additional fertilizer will not pay for itself.

Net income figures in the table show that when poor production practices were used on corn, profits from fertilizer did not increase much beyond 400 pounds per acre. But when excellent practices were used, profits increased rapidly up to 600 pounds.

For a crop of wheat, most of the profits from fertilizer seemed to be obtained from about 400 pounds, regardless of the kind of

Estimated yields and profits from different amounts of fertilizer in Ohio

Fertilizer applied*	Yield per acre		Profit per acre†	
	Poor Production Practices	Excellent Production Practices	Poor Production Practices	Excellent Production Practices
Corn	Bu.	Bu.	Dollars	Dollars
200 lbs. 3-12-12 ..	30	60	—10‡	24
400 lbs. 3-12-12 ..	45	80	6	46
600 lbs. 3-12-12 +nitrogen	50	90	8	55
800 lbs. 3-12-12 +nitrogen	50	95	3	57
Wheat				
200 lbs. 3-12-12 ..	10	25	—16‡	5
400 lbs. 3-12-12 ..	20	35	— 4‡	18
600 lbs. 3-12-12 ..	20	38	— 9‡	18
800 lbs. 3-12-12 ..	20	38	—14‡	13
Hay	Tons	Tons		
100 lbs. 0-10-20 ..	1.0	2.5	— 2‡	23
200 lbs. 0-10-20 ..	1.5	3.1	3	32
300 lbs. 0-10-20 ..	1.7	3.6	3	38
400 lbs. 0-10-20 ..	1.7	4.0	1	43

* Adjusted to a 3-12-12 fertilizer from the standpoint of price to make applimations comparable.

† Based on 1953 costs of production and prices for crops—corn $1.45 per bu.; wheat $1.90 per bu.; hay $22 per ton for clover-timothy and $25 per ton for alfalfa grass.

‡ Loss.

practices used. For meadows more than one year old, about 200 pounds per acre was all that could be used profitably with poor production practices. But with excellent practices, 400 pounds of fertilizer paid better than smaller amounts.

This method of figuring applies only if you have plenty of money to spend. With adequate capital, you can afford to use additional fertilizer as long as income increases more than costs. But if you have inadequate capital, other projects or practices may give greater returns for the money invested than extremely heavy applications of fertilizer.

For example, if livestock should return $1.50 per additional dollar spent, you could not afford to use fertilizer beyond the point where it returned less than $1.50 per dollar spent. If you used fertilizer up to the point where it just paid for itself, you would reduce total farm income by giving up some livestock that would be more profitable than the additional fertilizer used.

When an addiitonal unit of fertilizer just pays for itself, *profits per acre* are greatest. But when a dollar spent for fertiizer returns the same amount as a dollar spent on the next best competing alternative, profits are greatest for the *farm as a whole.*

In other words, if you have plenty of money to spend, the greatest profit per acre will add up to the greatest profit for the farm. But with limited capital, expenditures for fertilizer must compete with the available funds for other farm enterprises. In this case net income for the farm will be greatest before you have applied enough fertilizer to get the greatest returns per acre.

A decrease in the cost of fertilizer relative to farm product prices will make more fertilizer profitable and vice versa. During the last 20 years, fertilizer prices have not increased as much as farm product prices. For example, in 1933 Ohio farmers needed 66 bushels of corn to pay for one ton of 2-12-6 fertilizer; but in 1953 they needed only 29 bushels. This change makes fertilizer a better buy today than previously, and therefore more can be used profitably.

How can you tell how much fertilizer you can afford to use? First, you will need to know the probable yields from using different amounts. You will need this information up to the point where additional applications produce no further increase in crop yields. Then by calculating the value of the increased yield and the additional cost of producing it, you can determine the most profitable rate to use.

If you lack capital, you also should consider the possible returns from investing money on

other places on the farm. Other projects or practices may return more on the additional capital invested than extremely heavy applications of fertilizer.

How can you determine the yields from different amounts of fertilizer? Several ways are possible. Yields from smaller amounts can usually be determined from your own experience or that of your neighbors. Test plots on your own farm might be used to study the response from heavier applications than you normally use. Experiment station data might be used if your soils are similar to the ones on which the experiments were conducted. However, soils of the same type may give considerably different response from the same amount of fertilizer. For example, when the soil is low in available plant food to start with, response from fertilizer is usually greater than when these elements are already more abundant in the soil.

Soil tests are usually advisable for best results in determining fertility requirements and expected yields for individual farms.

Upward Swing in Pork Prices by Late '56

Pork may be commanding the lowest price on the meat totem pole right now, but not forever!

Karl Hobson, Extension price specialist, has advised farmers that "money-making opportunities in hogs will be here before we realize it—also before many producers are set to take advantage of it."

Hobson says hog prices will be improving before the end of 1956. And the upward curve will start a price trend that will last through 1957 and part of '58. "This will bring good returns to efficient hog producers who have access to barley at farm or near-farm prices," he says.

As for the current situation, Hobson says hog slaughter will be large and prices low during most of this year. But some letup is likely to begin in the last month or two of the year. That's indicated by the recent pig survey of the Crop Reporting Board. It shows that pig farrowings in the nine Corn Belt states in March, April and May will be 5 per cent smaller than a year earlier. The actual reduction may be greater than that since hog prices continued to decline for nearly a month after the survey was taken. Hobson says this indicates the improvement in prices and returns will be underway when pigs from these late spring farrowings reach the markets next November or December.

State College of Washington

. . . RODENT CONTROL . . .

The control of rats doesn't cost — it pays!

Condensed from Nebraska Farmer

Leslie F. Sheffield and *Robert E. Roselle*

RATS and mice have been among the most common and persistent pests of mankind since the beginning of time. Wherever man has gone — rats and mice have followed.

The Fish and Wildlife Service estimates that there are over 100 million rats in the United States, half living on farms and the remaining 50% in towns.

Estimates indicate that each rat (1) eats 40 pounds of feed yearly at a cost of $3.00, (2) contaminates other food at a cost of $6.00, and (3) damages property to the extent of $1 for a total cost of $10.00.

To the average farmer, the cost for boarding and housing rats during the year would be approximately $80.00. For about one-fourth of this cost an effective rat and mouse control program on the average farm could be undertaken on a year-around basis.

Rat and mouse control is similar in one respect to a farm safety program—that is, it cannot be practiced for only one week out of the year and still be expected to produce effective results.

In January, 1955, the U. S. Food and Drug Administration announced the renewal of their program of random sampling of grain shipments and the seizure of any wheat in interstate commerce which failed to meet the minimum sanitation standards. Since that time 32 carloads of wheat have been seized in the United States.

All but four were seized because they contained excess rodent contamination. Recently the Food and Drug Administration announced that, effective July 1, 1956, the standards for contaminated wheat would become (1) wheat containing one or more rodent pellets per pint; and/or (2) wheat containing one per cent or more of insect damaged kernels. Present standards call for the seizure of wheat (1) containing more than two rodent pellets per pint; and/or (2) containing more than two per cent of insect damaged kernels.

Also of importance to farmers

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is the Commodity Stabilization Service announcement that all wheat must meet the minimum sanitation standards in effect in order to qualify for a loan.

How To Detect Rats and Mice

These pests leave many signs of their presence. Among these are: (1) Gnawing signs. Look for signs of gnawing around doors, edges of boards or other rough surfaces that offer gnawing edges. (2) Droppings. Fresh rat and mouse pellets are sure signs of infestations. Look closely along walls, dark corners, behind objects offering hiding places. (3) Tracks. Examine dry, dusty floors in farm buildings, or scatter a thin layer of flour near walls and observe daily. (4) Live rats. Rats move about mostly during the night. Watch for them by switching on lights suddenly. (5) Burrows. Holes under floors, foundations, concrete slabs, and other areas offering protection are usually present if rats are plentiful. (6) Smears. Rats leave stained areas along runways, on rafters or openings. These stains indicate rat runways.

How To Prevent Infestations

Prevention of infestations is essential in all effective rodent control plans. Removal of food supplies by keeping garbage and waste foods in covered containers until burned or buried should be standard procedure on every farm. Store all foods in rodent proof containers. Line feed storage boxes, and lids with thin sheet metal. Rats and mice will not remain long if no food is available.

Removal of rodent shelters will greatly reduce the attractiveness of a farm to rats and mice. Stack all stored items neatly and close together on racks at least 12 inches above the floor. Stack all wood, lumber, machine parts, or materials out-of-doors on racks at least 18 inches above ground. Clean up or dispose of useless piles of straw, manure, junk, or other hiding places in the barnyard. Eliminate double walls, ceilings, and floors when possible. Neatness is essential in successful rodent prevention. Rodent proof buildings by covering all gnawing edges with thin sheet metal or 4-mesh hardware cloth. Raise buildings without rodent proof foundations at least 18 inches above ground level, use

A good dairy cow yields in her milk about 29 per cent of the digestible nutrients in her feed. She uses about 47 per cent of her feed for body maintenance and 24 per cent in the work of converting food nutrients into milk.

metal flashing on piers to prevent climbing.

How To Poison Rats and Mice

Anticoagulate compounds such as pival and warfarin are the active ingredient commonly used in modern rat and mouse baits. They are much safer than most old style rat poisons and more effective in that rats and mice do not develop bait shyness.

These baits prevent blood from clotting resulting in death from internal or external bleeding. The bait must be taken over a period of several days to kill rats and mice. These baits are available premixed for immediate use, or as 0.05% concentrate that may be mixed with oatmeal, at the rate of three ounces to three pounds of oatmeal. If larger quantities are desired, mix one pound of concentrate with 19 pounds of oatmeal. Addition of one teaspoon full of corn oil or bacon grease to each pound of bait will make it more acceptable to rats and mice. Treat only bait that will be used immediately or it may become rancid.

Oatmeal baits should be placed in protected bait stations in or near runways. Bait stations may be made from wooden boxes with entry holes sawed in each end. Commercially built stations may be purchased or temporary bait stations may be established by leaning planks against walls. Stations are used to prevent other animals from eating or scattering the baits.

Bait must be available at all times as rats and mice must feed daily from three to 10 days before they die. Bait stations must be inspected daily. After initial control is completed, the stations should be maintained but they need not be checked as frequently. The average barn, shed, and corn crib should have at least three stations each. Place bait in coffee cans or other containers inside the stations.

Traps

Traps are effective when infestations remain after poisoning, or when only a few rats are known to be present. Wooden base rat traps should be used with triggers enlarged with cardboard or thin metal. Traps should be placed in runways so that rats will be sure to run over the triggers. Mouse traps can be baited with bacon tied to the triggers or peanut butter pressed into the bait pits on the triggers. If traps are used, set at least six, or more, per building.

Community wide effort is essential to an effective rodent control program because rats and mice move frequently from one location to another. Well planned farm campaigns coupled with community action including towns and cities will produce results. Every control method should be employed.

Texas' Sunflower Breeding Program

Remarkable progress has been made in breeding a new crop for commercial production . . .

Condensed from The Cattleman

THE SUNFLOWER, a native of roadsides and fields, promises within a few years to provide farmers one of their most lucrative cash crops. In field tests at Texas Research Foundation, the new Renner-bred varieties have yielded 2,900 pounds of good seed per acre under experimental conditions. The market value of the seed over the past several years has ranged from 4 to 6 cents a pound.

"Sunflowers are considered the most important row crop in Canada, where hundreds of thousands of acres are produced each year," Dr. Collister, head of plant breeding work at Renner, Texas, reports. "They are grown in various sections of the Midwest and extensively in Argentina and Russia."

The seed of the sunflower, which contains about 30 per cent oil and 22 per cent protein, is used primarily for livestock and poultry feed. Its oil is used in the edible oil trade and is considered superior to cottonseed and soybean oil. It is noted as a high quality, semi-drying oil which has many industrial uses in paints and other products.

The objective in the sunflower breeding work at Texas Research Foundation is to develop strains which are high yielding, drouth tolerant, insect resistant and generally well adapted to the climatic conditions of Texas.

The sunflower breeding program was begun at Renner in 1947 and the scientists working on the project have been following, essentially, the same techniques which have been so successful in the development of profitable corn hybrids. They have worked to capitalize not only on hybrid vigor but to increase the drouth tolerance which the plant already possesses as a native of this region.

In its native state, the sunflower plant grows to 10 and 11 feet in height and its seed head is from 1½ to 2 inches across. Dr. Collister and his associates have developed what they consider an ideal plant growing from 3 to 5 feet tall with a seed head about 6 inches in diameter, filled out with large seed. It is high yielding and excellent for combining.

Reprinted by permission from The Cattleman, Ft. Worth, Texas

. . . Grassland Progress . . .

Dairymen find they can produce more feed on the same number of acres when they switch from grain to grass.

Condensed from Pennsylvania Farmer

James H. Eakin

THE grassland revolution in dairy farming is well under way. Research pouring in from all sections of the nation is proving that the modern dairy farm now, and in the near future, will essentially be a grassland farm. The high cost of labor and everything else the farmer buys has pushed many dairymen to the wall, and there seems to be only one logical method of escape, the grassland way.

Research first established the fact that the pounds of feed nutrients produced per acre was smallest in rotations which had the largest proportion of land in grain. With each increase in proportion of grass-legume acreage there was an increase in the total feed produced per acre. At the same time, as the proportion of land in forage increased, the amount of labor required to produce the feed nutrients decreased.

These facts are bound to have an astounding effect on dairy farm management all over the nation. Consider the all important facts as we know them today. With adequate management one can produce more feed on the same number of acres at less labor and at less unit cost of production. This is the situation in a nutshell as clearly shown in some excellent research from Ohio.

The figures in the chart should not be taken as critical of the corn crop, since an 80-bushel shelled corn yield compares favorably with 4 tons of high quality hay. It is not so much the corn as it is the one or two years of lower feed value small grain which follows the corn.

In the future less and less emphasis is going to be placed on the annual feed crops and more and more emphasis will be placed on forage crops. Ever since land has been farmed in Pennsylvania the grain crops program was planned first and the forage crops filled in. Many pastures are assigned to that land which is too wet, stony or poor to yield much feed. At times

Reprinted by permission from Pennsylvania Farmer, Pittsburgh, Pennsylvania

this may be sound, since forage will do better under these adverse situations than grain crops. However, many times this is literally biting the hand that feeds us.

Instead of planning the grain program first and the forage program second, try the reverse. Plan the forage program first and see how the grain program falls into place. Here are some goals:

1. Full forage feed the whole year.

2. Long time legume-grass mixtures to cut cost of production.

3. Staggered maturities of legume-grass mixtures so everything doesn't come into production in one week.

4. Adequate late-maturing legumes and grasses such as Birdsfoot trefoil and S-37 orchard grass.

5. A sound lime and fertilizer program based on soil testing.

Following are listed some of the most successful systems of grassland farming now being used in Pennsylvania.

Well-Drained Farm

For each mature animal or for each two heifers the following can be used:

½ acre Bluegrass
½ acre Birdsfoot Trefoil-Timothy
1 acre Alfalfa-Grass
½ acre Red Clover-Timothy
½ acre Orchard grass-Ladino

Farm With Mixed Drainage

For each mature animal or for each two heifers the following can be used:

½ acre Bluegrass
½ acre Birdsfoot Trefoil-Timothy
1 acre Alfalfa-Red Clover-Timothy
½ acre Red Clover-Timothy
½ acre Orchard grass-Ladino

Poorly-Dranied Farm

¾ acre Birdsfoot Trefoil-Timothy
½ acre Bluegrass
1 acre Red Clover-Alsike-Timothy
¾ acre Orchard-grass Ladino

Trefoil will never replace alfalfa in Pennsylvania, but last

OHIO STATE GRASSLAND STUDY

	Land in forage	TDN Produced	Relative Cost of Man hrs.	Feed nutrients
C-O-W-Clo	25%	2533 lbs.	100%	100%
C-W-A	33%	3016 lbs.	95%	82%
C-W-A-A	50%	3750 lbs.	58%	51%
C-W-A-A-A	60%	3950 lbs.	56%	46%

C—Corn, W—Wheat, O—Oats, Clo.—Clover-Timothy, A—Alfalfa-Grass. The same number of acres used in each of the rotations.

summer during the drouth alfalfa lost its leaves on good land and trefoil remained green on dry hillside slopes. As new improved varieties of trefoil come along this legume will lengthen the permanent pasture season by many weeks. At the present time if one has too much bluegrass pasture, which always means wasted pasture in the spring, one-fourth to one-half acre per animal unit should be converted into orchard-Ladino pasture.

Three acres of forage per cow may be too much grass. There are many well balanced grassland farms in Pennsylvania with two acres per animal unit, and a few with less. Naturally the number of acres of forage needed to yield a full forage feed the whole year will be dependent on the fertility of the soils of any farm. However, with present levels of fertility on most farms, three acres of total forage per each mature animal or per each two heifers is about right. As soil fertility levels are raised one might be able to sell hay or increase the herd size if he continued on the three-acre basis.

If you add up your cows and acres and determine that you are running your farm now on much less than three acres per animal unit you can be right or wrong. If your grain-milk ratio is about one to three you are probably wrong. With a full and adequate grassland program there is no reason why this ratio can't be stretched to one to five or one to six. There are also those who are feeding lots of high quality roughage with a grain-milk ratio of one to three or three and one-half. This is totally unnecessary. If you are going to cut the cost of producing milk then you must cut the cost of the grain bill.

Sometimes pasture renovation makes a lot of sense; other times it doesn't. To illustrate this point —a farmer looks over to a rocky, brushy hillside and says he is going to convert that to pasture. Why? Because he doesn't have enough pasture. But is it because he doesn't have enough acres or not enough production on those acres now in pasture?

Often a farmer stands on potentially good pasture near the barn and thinks about spending $125.00 per acre to renovate pasture over in "left field." The pasture he now stands on would produce twice as much, or more, if he spent $20.00 per acre on lime and fertilizer. This kind of thinking might save one a lot of grief and money. Most of us would admit that pasture renovation has been a success in Pennsylvania, but why shouldn't it be since it takes about four tons of lime and 800 pounds of fertilizer per acre? Try putting only half that amount on some of your old pastures near the barn!

Parity is What You Make It

Few farmers have a clear understanding of what parity really means . . .

Condensed from Michigan Farmer

Daniel W. Sturt, Michigan State University

PARITY is much in the headlines. It is everyday conversation among farm folks. Everybody talks about it, but too few seem to know what it means.

Parity means many things to various people. To the farmer parity means his just reward. To the consumer it suggests higher food prices. To the taxpayer parity means government subsidies and higher taxes. To the politician it means votes. But the average citizen—as he sizes up the situation—sees in parity the search by the farmer for his fair share of the nation's income.

During the past 4 years farmers have watched their income decline. Falling farm prices and increasing costs have created a cost-price squeeze. At the same time, the rest of the folks in this country are enjoying greater prosperity than they have ever known before. So parity becomes the order of the day for many farm groups. Perhaps it would be well to examine closely the parity idea.

Parity Has 2 Meanings

Basically, parity has 2 meanings. It is a coin. One side says "fair treatment" or "parity income"; the other side says "parity price." And there's a big difference, although many people find it convenient to confuse the 2. For example, a stand favoring 100 per cent of parity may turn out to be a stand for 100 per cent of fair treatment and not 100 per cent of parity prices.

By one definition of parity, it means fair treatment for agriculture, or parity for farm folks—an income equal to that enjoyed by their city cousins.

The other definition of parity is parity price— a price based on a formula figured to bring about parity income. But the 2 are not necessarily the same, and it is important that we understand the difference.

Agricultural prices fell 50 per cent from 1929 to 1932. During these depression years, there was much interest in doing something to help agriculture strengthen

Reprinted by permission from Michigan Farmer, Detroit, Michigan

her economic position. How could this be done?

It is difficult to put the incomes of farm and industrial people on a par. It was decided to take a period when farm folks were receiving what was believed to be their fair share of the national income — a period when the level of farm prices was high comparable to the level of industrial prices — and attempt to restore that relationship. From 1910 to 1914 was considered to be such a period. The economy was relatively free from the effects of war, depression, or other so-called abnormal economic conditions. Farm and non-farm prices appeared to have been in reasonable balance with one another.

So the parity price idea was born—that price which would give farm commodities the same buying power that they had enjoyed during this base period. Equal purchasing power was the key. If a bushel of wheat would buy a work shirt in the base period, then—with a full parity price for wheat—a bushel of wheat should buy a work shirt today.

Can't Guarantee Parity Income

It was in the search for a parity income formula that the government, no doubt, found it necessary to settle for a parity price formula, in the belief that parity prices would bring about parity income.

But this is by no means the case. Income includes something more than price alone. Income takes into account volume. You may be receiving more than a parity price for your products and still be losing money. A parity price does not mean that you are going to make money. It does not guarantee you a parity income from the operations on your farm.

By the same token price guarantees for the products you sell at 100 per cent of parity do not assure you fair treatment from the standpoint of a parity income. It may be that prices which are 125 per cent of parity are necessary to give agriculture that fair treatment. Or parity income may be brought about through prices which are 60 per cent of parity. One doesn't know. What we do know is that parity price and parity income are 2 different things—and income is the real concern of farm people.

Parity, as we know it today, is an idea that looks backward. It measures farm and industrial prices in relation to those of 1910-14. Times have changed. Industry and agriculture have progressed. New methods have been introduced. Electricity has replaced the kerosene lamp. The tractor has replaced the horse. It is an era of specialization. Industry, too, has advanced, and folks are living better than they

have ever lived before. Most of us would not want to go back to 1910.

The peoples' tastes have changed, too. They're demanding different kinds of things—new products from our great production lines. To discourage the kind of price relationships which bring about the production of those things consumers want is to hold back progress.

BEEF . . . $2.98 POUND

Prices in the Soviet Union would shock American homemakers. Here are some prices observed by an American delegation at a market in Kharkov (converted from rubles to dollars, with rubles valued at 25 cents):

Fat salt pork $4.30 per lb.
Lean beef . . $2.38 per lb.
Eggs . . . . . .25 each
Milk . . . . . .75 cents per qt.

And here are some clothing prices found in a state department store in Odessa:

Print dresses . . $ 75 to $125
Men's suits . . . $300 to $435
Men's o'coats $200 to $500

The grocery prices were observed in a free market, where farmers were selling vegetables from their own garden plots and produce from their own animals. Food was somewhat cheaper in state stores, but fewer items were available..

Base Period Was Long Ago

We should also remember that both the parity income and parity price ideas lead us to accept as our goal the price and income relationship between agriculture and industry which existed in the period from 1910-14. Anything which may have been out of line then would be out of line now—should we copy the same price relationships.

Most folks agree that agriculture is not being paid as well as it should be. They feel something should be done to make it possible for farm resources to be rewarded on a basis which is more in line with those received in industry.

In our search for the right kind of legislation to bring this about—in our search for the kind of farm price policy we want—let us remember: (1) the backward nature of this parity idea; and (2) the fundamental difference between parity prices and parity income. And while we are all in favor of fair treatment for agriculture, let us not be mistakingly led to believe that this fair treatment can be measured in terms of the level of parity prices alone.

Let us know the difference and act accordingly in selecting the farm program of our choice.

Do You Work Your Soil too Much?

Excessive tillage often does more harm than good . . .

Condensed from

Wisconsin Agriculturist and Farmer

MANY SOIL scientists say we are working the soil too much. Some farmers agree. They have both research and field results to back up their arguments.

They say many seedbed operations carry over from habit formed when horses pulled light, less-effective equipment. Now, tractors and plows do a better job of turning the soil. So there's less need to work the seedbed so many times.

Extra times over the field with heavy machinery is hard on the soil. Ohio tests show that heavy machinery plugs soil pores, breaks down structure, slows aeration and reduces root penetration.

Connecticut tests show how much machinery packs the soil. Six uniform strokes forced a core sampler into soil in the row. But where the rear wheel of a tractor packed between rows, 13 strokes were needed.

Stirring the soil too much can be harmful, too. New Jersey tests showed less air space and more compaction in overworked soil. It puddled when wet and formed a crust on drying.

Corn with one cultivation in these tests gave the same yields as corn cultivated more often. Chemicals helped control weeds.

R. L. Cook, Michigan State College soils specialist, says, "We recommend minimum tillage for oats, corn and sugar beets. That's on all soils where use of the moldboard plow is practical."

He figures this way: Main purpose of tillage is to give crops a chance to compete with natural vegetation. A moldboard plow does this by turning under vegetation. Then, any implement that makes accurate planting possible gives all the tillage needed for most crops.

Cook's tests showed the same yields for crops with minimum tillage as with regular treatment.

John Slipher of Ohio State University says, "Farmers can prepare seedbeds with less tillage. A rotary hoe or harrow after the plow is often enough."

Frank Schaller, Iowa State

Reprinted by permission from Wisconsin Agriculturist and Farmer, Racine, Wis.

College soils specialist says, "Minimum tillage can give good corn yields. Over tillage breaks down soil structure. But it is hard to tell just how much tillage is harmful.

"If operations are spaced to allow weed seeds to germinate, extra tillage may pay. But seedbeds don't have to be smooth to get good corn stands."

"Many farmers overwork land that is going into corn. But seedbeds for small grain and grass-legume seedings are seldom overworked," Schaller concludes.

In some tests corn has been grown without seedbed tillage. Mulch planters and hard ground listers sometimes require no advance seedbed preparation.

Several Wisconsin farmers have tried planting corn immediately after plowing with no extra disking or digging. The results so far have been excellent.

Where long rotations are used there isn't too much worry about packing the soil. You will have most trouble on those fields which are cropped year after year.

Cow Vacations Valuable

As dairymen have long suspected, cows do produce more milk and butterfat if they have at least six weeks to two months of rest between lactations.

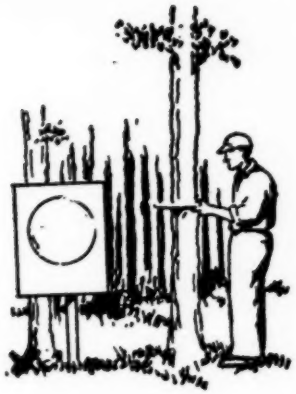
That was proved from a summary of records on 3,500 dairy cows. The figures were compiled by IBM machines from dairy herd improvement records at Michigan State University.

Extension Dairyman Larry Johnson reports these comparisons on the results of various rest periods for cows:

Holsteins dry less than two weeks produced 347 pounds of butterfat and 9,511 pounds of milk. Those dry two weeks to a month, 390 pounds of butterfat and 10,838 pounds of milk. Cows dry four to six weeks, 404 pounds of butterfat and 11,218 pounds of milk. And those dry six to eight weeks, 413 pounds of butterfat and 11,567 pounds of milk. Figures for other breeds are in the same proportion, according to Johnson.

The average was slightly higher for cows that were given eight to 10 weeks' vacation. But, Johnson indicates, the difference probably wasn't great enough to pay for the extra feed needed.

Michigan Extension



They Save Every Stick of Lumber

An interesting account of a small lumber mill where wood is used to its best advantage . . .

Condensed from The Ohio Farmer

Delmer E. Groves

DO YOU hate to see wood wasted? It seems a sin against nature to cut a walnut log into inch boards for flooring the chicken house. Similarly, it's a waste of timber to saw a log into 2 x 4's when it is big enough to cut out 12-inch boards.

A tree big enough for saw timber is often more than 100 years old. When it takes that long to grow, it pays to find the best use for every "stick."

Often this is difficult because of the mill or the place you have to sell the lumber. But the Hoge Lumber Company of New Knoxville in Auglaize County, Ohio, makes this trick as neat as "falling off a log." Their plant is equipped to cut each log into the kind of lumber for which it is best suited.

This plant was started at the turn of the century by H. H. Hoge. At first he was a carpenter working on homes and barns and then he started a barrel hoop factory. The business soon turned back to erecting buildings and four Hoge boys joined the business.

The oldest son, Arthur F., now oversees the entire operation—he calls himself "just a plain board peddler." G. A. Hoge is the timberman. "J. W." is an architect and engineer and "O. H." specializes in retail selling and designing buildings. A tenth of the entire population of New Knoxville works at the Hoge plant. They're all enthused about using lumber to its best advantage.

This was the first commercial outfit in the state to be honored for wise management of their own timberland. This award was given by the state division of

Reprinted by permission from The Ohio Farmer, Cleveland, Ohio

forestry. The firm has bought several tracts of timber marked for selective cutting by George Lodge, farm forester in northwestern Ohio. They follow the cutting which he recommends.

When a market tract of timber is bought, the owner may either cut the trees or have Hoge do the job. The logs are then taken to the mill for finishing. If an outright purchase, the lumber is handled according to the demand which exists for special kinds and sizes of lumber.

Small pieces of lumber find their way into such things as meat sticks, brush handles or other special purposes. Hoge's turned the town's abandoned school house into a brush factory and this gave them a new market for wood.

The mill also makes kiln-dried hardwood flooring, interior trim, doors, window frames and machined wooden parts for industrial uses. They've even sawed lumber for the shipbuilding industry. The odds and ends of lumber are baled up and stored until a use is found for them.

The mill operates on sawdust and burnable refuse. It uses steam first for power, then for heat to dry lumber the modern way. All sorts of electrical equipment have been installed to take the hard labor out of the mill.

But the main use of wood from the Hoge mill remains in barns, farm buildings and houses. They can supply the entire building and will load in onto a truck, deliver it to the farm and erect it.

Or, you can contract to have them saw up your timber for a new building and they will deliver it to the farm for you to build. Here, too they make full use of all lumber.

They've developed a system of building round-roof barns which makes use of six-foot strips of inch lumber which would otherwise be wasted. These are laminated by nailing together to form the rafters.

Let's look over their shoulder as they worked for Enoch Schroer in Auglaize County. Enoch's barn burned and he was forced to come to a decision before winter started. He had just sold his timber to the Hoge company and they offered to turn it back to him for the new barn. Not only that, they studied his needs, the lumber available and came up with a plan and detailed drawings of how to build the foundation, locate the pillars and erect the frame.

Two experienced barn builders led the crew of neighbors which had a new barn roofed on the Schroer farm just 48 days after the fire.

The neighbors felled the trees, the lumber mill hauled the logs to their mill, sawed them up and delivered the lumber back to

the farm. Some of the small and undesirable timber proved suitable for barn building.

A large quantity of rough structural lumber went into the nine-foot frame to the square. The mow floor joists were cut from rough hickory. The round roof rafters were made on the spot from 700 separate small pieces of one-inch wood, none of them longer than 8½ feet.

Six timbers 26 feet long were used for mow floor carriers. The frame in the gable ends used some pieces 6x6x21 feet. Good rough, white oak logs were sawed into 2x6's and 3x8's for the sills.

Schroer had to buy lumber for the mow floor (which was first used for the concrete forms), siding, roof sheathing, asphalt roof shingles, hardware and a few other items. He has a barn which meets his dairy needs.

The original whistle was installed in the Hoge mill in 1900. It still blows morning, noon and night. It's a constant reminder to farmers of the neighborhood that lumber still plays an important part in every Ohio farmstead.

Residual Effect of Fertilizer Sown on Soybeans, Oats

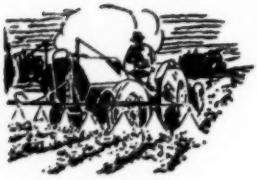
Up to 10 bushels more oats per acre in 1955 from a field fertilized for corn in 1954—that's the residual effect reported by a University of Minnesota soils specialist.

Jack M. Mac Gregor reported that 60 pounds of anhydrous ammonia per acre applied either in fall, 1953, or spring, 1954, not only increased the 1954 corn yield, but boosted the 1955 oat yield on the same land up to 10 bushels.

Comparing fall-versus-spring fertilizing, Mac Gregor found that there was no difference in effectiveness. Mac Gregor also had some striking results to report in soybean fertilizing studies. Apparently, an already fertile field—for example, one that would yield 110 bushels of corn in 1954—would not be noticeably benefited, yield-wise, in its 1955 soybean production.

He told of a low-fertility field in which part was left unfertilized—giving a 60 to 70 bushel corn yield. A second part of the field was fertilized with 60 pounds of anhydrous ammonia per acre. Result: corn yield rose 18 bushels per acre and 1955 soybean yield went up five bushels—that is, 15 bushels, compared to the 1954-unfertilized field's 10 bushels. *Minnesota Extension*

Progress in the Insect Battle



Pesticides, systemics, parasites and viruses are today's weapons in the fight against insect enemies . . .

Condensed from
American Vegetable Grower

G. J. Haeussler, U. S. Department of Agriculture

STRIKING developments in the control of many insect pests, including those of importance to the vegetable grower, are continually being made. These are providing more effective means of combatting insects than was even dreamed possible 25 years ago. Nevertheless, consistent scientific progress against insects is essential to enable us to produce the necessary supply of high quality vegetables.

DDT, methoxychlor, toxaphene, lindane, chlordane, aldrin, dieldrin, TDE, parathion, malathion, TEPP, and Aramite are some of the many powerful insecticides and miticides now in common use. Some vegetable growers are even beginning to use the systematic materials such as demeton. With such an imposing array of pesticides available it would seem that most of our vegetable insect problems should be well solved.

Unfortunately, however, perplexing problems still exist.

The question of insecticide residues has long been of major concern. New insecticides, many of which have a high degree of toxicity and long residual effect, have added to rather than solved this problem. Federal, state, and commercial agencies are intensifying research on the toxicology of insecticides. Materials are recommended for use in the soil or on food crops only after careful studies have shown that harmful residues will not occur on or in the edible products. Also, when necessary, the harvested products are evaluated to ascertain any possible adverse effect on flavor. Therefore, by using the pesticides only in accordance with recommendations, growers are assured their treated crops will be free of objectionable residues or flavor resulting from the insect control measures used.

Among the new methods of applying insecticides, widely used by vegetable growers, is seed treatment prior to or at the time

Reprinted by permission from American Vegetable Grower, Willoughby, Ohio

of planting. Combinations of small quantities of insecticide and fungicide applied to the seed, either as a dry powder or as a slurry, provide dual protection to crops such as beans, cucumbers, and melons from damage by the seed-corn maggot and seed-borne plant diseases. Residue problems are not encountered or are at a minimum with such treatments.

A problem of major importance to vegetable growers in some areas is the tendency of certain insects and mites to develop resistance to commonly used insecticides or miticides. Many growers now find that DDT, formerly very effective against the cabbage looper, no longer satisfactorily protects their cabbage, cauliflower, and lettuce from damage by this pest. To control it they must now use other materials such as toxaphene and endrin.

The green peach aphid on potatoes has become resistant to DDT and parathion in parts of Washington and Oregon. Yet these same materials still give satisfactory control of this insect on potatoes in Maine and elsewhere.

Other vegetable pests which, according to reports, have recently become increasingly difficult to control in some parts of the country with materials formerly effective include the Colorado potato beetle, the potato flea beetle, the imported cabbageworm, the Mexican bean beetle, and spider mites on greenhouse-grown vegetables and on strawberries.

Research is being intensified to find effective alternative materials or measures that can be recommended to protect vegetables from these pests that are no longer satisfactorily controlled by the standard insecticides.

Studies in Arizona have shown that the use of DDT on cantaloupes destroys many of the parasites and predators that usually help reduce populations of the melon aphid, leafhoppers, leaf miners, thrips, and spider mites. Also that the experimental use of dieldrin on cantaloupes resulted in increased spider mite infestations, indicating that this material may have killed many of the natural enemies.

Recent field studies in California showed that DDT, heptachlor, aldrin, isodrin, endrin, dieldrin, chlordane, Diazinon, toxaphene, and parathion are very toxic to the lady beetles, predaceous bugs, lacewings, and spiders which serve as important natural enemies of lygus bugs on beans.

Such observations emphasize the need for more intensive research to determine the effect of pesticides on the natural enemies of vegetable insect pests.

During the past two years many thousands of egg parasites of the

beet leafhopper, bred from material obtained in the Mediterranean area, have been released in California, Arizona, Utah, and Idaho. This work is carried on co-operatively by the entomology research branch of the USDA and the University of California. If these parasites become established they should aid in protecting beans, cantaloupes, spinach, beets, and other susceptible crops from curly top, the destructive virus disease transmitted by this leafhopper.

The use of diseases of insects to help control injurious pests has long been considered by entomologists and pathologists. Renewed interest in this has been stimulated in recent years by increased knowledge of the effect of diseases on insect populations.

The successful use of the bacterial milky diseases for control of Japanese beetle grubs in the East and the dissemination of a virus disease from aircraft to combat the alfalfa caterpillar in California are outstanding examples of the practical value of this natural control method.

Some of the micro-organisms that affect insects can be produced in large quantities and are easily distributed in the form of sprays or dusts. They are harmless to animals and plants.

Many are highly specific in action and are thus harmless to parasites, predators, and pollinating insects. Most of the micro-organisms are not appreciably affected by insecticides and can, if necessary, be used in conjunction with chemical control measures.

Experiments are now underway to determine the possibility of using a virus disease which, in preliminary laboratory and field tests, has shown some promise against the cabbage looper on cabbage, broccolli, lettuce, and other vegetables.

And so the fight goes on. Although the vegetable grower must battle relentlessly to keep ahead of his insect enemies, research is continually producing new and better combat methods and materials. Some of them may even prove to be nature's own weapons.

DON'T BE KILLED BY LIGHTNING

When a thunder storm threatens, the best place to be, if there is any choice of shelter, is a large metal frame building or a house or other building that is protected against lightning. The most dangerous buildings are the small, unprotected ones. If out in the open where there are no buildings, the best thing to do is hit for a thick stand of timber, or even a depression in the ground. And stay away from wire fences, isolated trees, hill tops, and wide open spaces.

Irrigating Feed Crops

Here are farmer experiences which prove that management is the key to success when irrigating feed crops . . .

Condensed from Breeder's Gazette

Betty Connor

YOU CAN travel all over the Cornbelt inspecting farms with sprinkler irrigation and never find two systems exactly alike. But you'll discover that every successful irrigation project has these two points in common:

(1) A reliable source for plenty of water.

(2) A well-managed program of operation based on knowing your soil and plant needs.

You sense the importance of good management when you talk to Ohio farmers like Bill Martin and Gene Mace.

Mr. Martin has been using a sprinkler system for 10 years to bring out the highest potential in land once too wet to grow anything but poke weeds. Mr. Mace, dissatisfied with 98-bu. corn, put in his system this spring and is increasing his yield to 130 bushels.

The Martin farms include 2,000 acres in Hardin Co., stocked with 150 Angus cows, 40 Holsteins in milk, 150 sows and 250 ewes. W. A. Martin has turned over much of the active work to the five young men who live on the farms. But the guiding hand of the veteran livestockman is very much in evidence.

The story of the Martin irrigation project goes back 35 years to the establishment of the Scioto Conservation District when a channel was dredged through the Hardin swampland. Once dried off the black muck looked rich and promising. But in the section Martin now owns, one farmer after another tried and failed. The land simply wouldn't produce in spite of miles of drainage installation.

Bill Martin became intrigued by the challenge of the muck.

Reprinted by permission from Breeder's Gazette, Spencer, Indiana

He couldn't resist the first quarter-section that looked like a bargain. Then someone gave him 50 acres scot-free. Finally he took the deep plunge when an additional 800 acres came on the market at a giveaway price. Now he had to make that marshland produce.

With the help of agronomists at Ohio State it was determined that the muck harbored an overabundance of minerals. Rainfall was gradually carrying them down to the drainage tile, but they lodged. The pH reading of the soil was 3. Martin called on drainage experts. "Don't let the water rest," they said. "Pick it up on the hillsides in a heavy rainfall and keep it working so that the minerals stay in solution and flush out the pipes."

So the tile was taken up and relaid with the ends extending above the marsh pockets into the surrounding rises. It now has a 2 inch fall to each 100 feet. A total of nearly 40 miles of pipe was interlaced under the muck and the pH reading soon went up from 3 to 5. With the addition of 8 tons of limestone to the acre, crops began to thrive.

But once the land was drained, Mr. Martin was confronted with a new problem. The powdery muck dries quickly. Under a hot sun, the water table drops 18 to 20 inches in a week. Irrigation now looked like the next step and he began to pump water from an old gas well that gave a never failing supply.

Over the years Martin has been increasing his yields steadily. Today with his thorough drainage system, his program of liming, fertilization, rotation and irrigation, he is turning out 120-bu. corn on land that wouldn't produce 10 bu. when he took it over. On a 25-acre black muck field of oats, seeded to alfalfa and brome, and irrigated 4 times, he cut this year 5 to 6 tons of silage and a ton of hay to the acre.

"In the ten years I've been working with irrigation," Mr. Martin explained, "there have been only two when extra water wasn't a major essential for big yields; 1955 was one of them. But even in these two years, it has been important in getting a good stand of seedlings. For instance, we can always count on getting our oats in a month earlier. And we were able to set our seeding date for the alfalfa-brome mixture on the 9th of May this year, without worrying about germinating failure for lack of rain."

Three inches of water was put on the oats in 2 applications, 1¼ inches of water twice on the alfalfa. The surplus Chrysler engine can pump 600 gallons a minute through 1400 feet of pipe which can be used to irrigate 60

acres. Martin is using two dozen 25-gallon sprinklers but likes the big 1-inch sprinkler for its covering capacity, especially in corn. "One of the things I noticed soon after starting irrigation was leaf spotting. A big stream of cold water can cause damage much like frost. The solution has been to vaporize the water into a fine mist."

Mr. Martin, could you furnish the beginning irrigator some tips? "Well, first and most essential before you go into irrigation," he says, "is to be real sure you've got the water. Most ponds just aren't big enough to irrigate any sizeable area. A shallow stream won't produce very long if a number of farmers pump from it. And a well can be tricky. I know one farmer who got his system all set up and hooked into a well that had never gone dry. He pumped exactly one minute and a half before it gave out.

"Don't forget the cost of operating," he added, "when you figure what you are going to put into the system. Our fuel costs run 4 gallons of gas an hour to put ½-inch water on 2 A. After you've covered a lot of acres a time or two that begins to run into money. You've got to have land capable of producing enough additional to cover all your costs and make a profit."

Did he think other farmers would benefit from irrigation? "Several of my neighbors are making it pay well on potatoes and onions and truck crops. It has done a good job for me on corn and grassland. If you've got the water it's worth a try."

Eugene Mace of Pickaway Co., in southern Ohio, was fairly sure of a constant water supply. With 100 A. of bottomland along Deer Creek, he was already turning out some hefty yields of corn, feeding a third to 300 hogs—he has 20 sows—and selling two-thirds.

The young corn-hog farmer had planned to install his system in 1954 just before his plants tasseled. But a generous rain came along just at the right time and the installation was postponed until last spring. His 1954 yield was 98 bu. to the acre. That portion of the crop he cashed in was 4800 bu. by weight, but sold for 5100 bu. shelled.

A lot of farmers would say Mace was doing pretty well, but he's one of the calibre that won't settle for anything but the best. That's the way he set an unofficial world record for tractor pulling at the Circleville Fair a few years back. Driving in the free-for-all division and using a 3-4 plow Massey-Harris tractor weighted to 13,000 pounds he pulled 39,480 lbs. of concrete blocks a distance of 20 feet, starting with a tight chain.

Mace is as enthusiastic about

his irrigating experience as he is proud of that tractor pulling record. "It looks like the coming thing," he says. "Our average rainfall in the growing season is 18 inches and it takes a 21-inch average to produce 80 bushels on this bottom land, so I felt sure the extra water would pay off. And it has."

Mace had the help of experts at Ohio State in planning his system. 40 acres were irrigated this year with water pumped from spring-fed Deer Creek. 50,000 gallons an hour made no noticeable dent in the creek's flow, but Mace has filed his water rights just in case a lot of others decide to tap the same source and cut his supply.

In the irrigated section of his corn, plants in the row were spaced more closely—9 inches as against 12 inches in the non-irrigated portion, with 38 inches between rows in both cases. Fertilizer was increased from 3-12-12 to 5-20-20, 500 lbs. to the acre, with 300 lbs. plowed down and 200 lbs. put in the row. Seeding was 27,000 to the acre, with 23,000 plants in the stand.

"That's one of the things I like best about irrigation," Mace explained. "We put on the first application of water after seeding on May 15. No matter how long it is between rains you're sure of getting the corn up and you can use less seed."

Altogether, 6 inches of water was put on Mace's corn—2 inches after seeding, 2 inches in mid-growth, 2 inches when tasseling and shooting. The costs, including fuel for the 102 hp. engine using 7½ gallons of gas an hour, depreciation on the equipment and labor, figured $2 per acre-inch of water. What was the result?

"There are several types of soil in this creek bottom," Mace pointed out. Some marsh, some Fox with underlying gravel, and a good deal of sandy-gravelly loam. All of it showed improvement, with the yield doubled in the sandy-gravelly section, and an overall increase in the 40 acres irrigated of from 25 to 30 bushels. The average yield per acre this year (1955) is going to run about 130 bushels.

Mace is using 5/16-inch sprinklers on 8-foot risers, with 6-inch main line and 4-inch laterals to cover 5 acres at a time. The system operates for 6 hours to put on 2 inches.

"Getting the pipe moved is the most difficult part of the job," Mace admits. "Those corn leaves are sharp and it's a good idea to wear a heavy, long-sleeved shirt. Next year we are going to leave grass strips for the main line. We tried one idea that worked out. On the last irrigation when the corn was tasseling, we started irrigating from

the outside, working the laterals toward the center on each move. We let the pipes stay there in the middle until the corn was matured enough for the hogs. Then we picked the two center rows and used a wagon to take out the pipe."

When will you start picking? "That's one of the disadvantages of irrigation," Mace stated. "With all that extra water the corn stays greener longer. What we really need is a new corn hybrid adapted for irrigation. Our present hybrids will produce a high yield, but they are too shallow rooted and too tall for irrigation. Even an 8-ft. riser isn't tall enough to get the water out over them, and a windstorm after irrigation can do a lot of damage. Also we need a faster maturing plant for earlier picking."

The hybridists are working on just such a plant. But Mace isn't going to postpone his future irrigation plans until it's perfected. Next year he plans to irrigate his entire 100 acres of corn.

Two New Worm Compounds for Hogs

Two new cadmium compounds—cadmium oxide and cadmium anthranilate—have been found to be very effective in the removal of large roundworms in swine, report specialists at West Virginia University. Cadmium oxide is most effective when fed as .015 per cent of the ration (wet or dry) for a period of three consecutive days.

Cadmium anthranilate, tried on a more limited scale, also has been found to be very satisfactory. It has not been checked by research as thoroughly as had the cadmium oxide. The work that has been done shows that cadmium anthranilate is best used when fed as .044 per cent of the ration (wet or dry) for a period of three consecutive days.

Both compounds seem to be safer to use than the sodium fluoride, while being just as effective. They have the advantage of a three-day feeding which tends to give all hogs about the right amount of the worming compounds. Hogs need not be kept off feed nor the feed restricted the day before the treatment begins.

The cadmium compounds must be secured through a veterinarian or druggist. At the present time they may be difficult for farmers to get because they are relatively new. The Extension specialists caution farmers to follow the directions on the containers carefully and to be sure to mix these compounds thoroughly with the feed. *West Virginia Extension*

You Can Save $125 A Month

By cutting hay two weeks earlier, grain purchases for a 30 cow herd can be reduced this much. Here are the dramatic findings of recent research . . .

Condensed from Hoard's Dairyman

J. Thomas Reid, Professor of Animal Husbandry, Cornell University

CHANCES are that, if you have 30 cows and cut your hay crop at the same time your neighbor does, you can save as much as $125 per month by moving up your cutting date two weeks. You'll probably ask, "Why is this possible?" The answer is simple. Young forages have higher feeding values and produce more milk than more mature ones.

This answer has been known for a long time. But, since the advantages of early harvesting have not been put into figures, it has not been used much.

Most of the practices (particularly those dealing with protein) used in feeding dairy cows are based on:

1. Whether the roughage is legume or non-legume; and
2. The assumption that roughages in general have only 50 per cent t.d.n.

When only these factors are used in balancing rations, we may overfeed or underfeed our cows on grain and/or protein. This is the result of not considering the stage of maturity of our roughages.

Recent research at Cornell University provides more refined tools for balancing cows' rations. These figures make is possible to predict the main feeding qualities of roughage *if you know when it was cut.* As a result, you can do a more accurate and economical job of feeding now than you have been able to do previously.

Here is what the research turned up:

Cows eat more early-cut than late-cut forage. Look at the chart in this article. It shows that in the Northeast about twice as much dry matter will be consumed from a crop cut on June 1 as from the same stand of for-

Reprinted by permission from Hoard's Dairyman, Fort Atkinson, Wisconsin

age let grow until the middle of July before cutting.

Although growth stage is most important, other things, such as leaf content, influence palatability. There is, therefore, a difference in the intake of several forages cut on the same day.

Feeding large amounts of grain also lowers the consumption of roughage. The intake of late-cut roughages is probably depressed more by grain feeding than is the case with early-cut roughages.

Cows get more energy per pound of dry matter from early-cut than later-cut forage. In the Cornell experiments, the t.d.n. content (which is a measure of energy value) was studied in more than 70 forages cut between May 18 and July 8. When the forages had not been cut or grazed previously during the same season, the t.d.n. content decreased 0.5 per cent per day after April 30.

But most important, *the amount of t.d.n. could be figured from the cutting date.* This held for forages no matter whether they were fed green or as a silage or hay . . . provided they were first cuttings and a disproportionate loss of leaves had not occurred.

Timothy vs. Alfalfa . . .

This means that timothy cut on the same day as alfalfa has about the same energy value as alfalfa (or any other plant tested to date). It is possible that the t.d.n. content of some kinds of plants may not follow this pattern. But the results to date indicate that the t.d.n. content of the common forages drop off at a predictable rate.

t.d.n. and digestible protein contents (%) of hays or silages on dry basis**

Cutting date*	Nonlegumes Growth stage	t.d.n.	Dig. Prot.	Legumes Growth stage	t.d.n.	Dig. Prot.
		First cutting				
June 1	Vegetative	70	13.5	Vegetative	70	18.7
June 15	Early head	63	10.0	Bud	63	14.5
July 1	Full bloom	56	6.7	Bloom	56	10.2
July 15	Mature	49	3.7	Mature	49	6.4
	Aftermath following regrowth for 5 to 9 weeks					
		58	10.0		58	14.3

** Mutiplying the above values by approximately 0.9 and 0.23-0.27 gives values for hays and silages, respectively, containing the usual amounts of moisture.

* The values given for various dates probably apply to most of the Northeast, but are not expected to apply to the conditions of the South or far West. Latitude and elevation undoubfedly influence this picture.

The feeding qualities of aftermath forages are somewhat different from those of first cuttings. In these tests, the t.d.n. content of second and third cuttings, after regrowth periods of five to nine weeks, varied from 62 to 57 per cent. This kind of forage does not fall off in t.d.n. as rapidly as first growths, but remains fairly constant.

The value of 58 per cent listed in the table would seem to be safe for use in feeding practice. You may be surprised that second and third cuttings never have as much t.d.n. as first growths cut in the Northeast by the first week of June.

At the same growth stage, legumes are higher in protein than nonlegumes. But the amount in both kinds of plants decreases greatly as forages approach maturity. Because of this, nonlegumes cut early can have more protein than late-cut legumes. This point is generally overlooked in practical feeding.

The protein in first cuttings becomes progressively less available to the animal as the plant approaches maturity. As a consequence, advancing growth stage has a doubly bad effect upon the value of forage protein.

The protein value of second and third cuttings was found to be relatively constant but dependdent upon the kind of plant. A striking characteristic of these forages is the large amount of protein relative to the amount of t.d.n. they contain.

It will be observed that the table lists protein as "digestible protein." In figuring rations for cows, this value is used instead of "total protein," because it combines the amount and availability of protein.

Lower percentage of protein needed with poor-quality than with high-quality roughages . . .

In lowering feed costs it helps to feed only as much protein as is needed. Although overfeeding on protein is not harmful, it is wasteful and expensive. At this time, high-protein feeds cost a good bit more than low-protein feeds, such as the cereal grains.

Many dairymen are feeding mixtures containing more than 16 per cent total protein. However, the Cornell tests indicate that, when enough concentrate is fed with the commonly used roughages to give cows enough energy, there is never a need for more than 16 per cent protein in the grain. Often-times, 10 to 12 per cent is plenty.

Since poor-quality (or late-cut) forages are generally lower in protein, the belief is often held that cows eating poor-quality roughages need a high-protein grain mixture. Although, at first glance, this seems logical, it is

exactly *opposite to the truth.* The reason it is wrong is this:

As forages mature and their protein content falls off, the intake and energy value also drops. These events cause an increased need for concentrates to provide enough energy. But increasing the amount of grain tends to *lower the percentage of protein needed* in the grain.

It is not always possible or practicable to cut forage early. There are many disadvantages. On the other hand, you have to balance against these disadvantages the amount of grain that you can replace with early-cut roughage.

For example, let us assume you are feeding 30 cows producing 40 pounds of milk per day. If you feed them enough grain mixture to give the cows enough energy, it would cost (at present prices) up to $170 more per month for grain with roughage cut July 1 compared to hay cut July 15. If you cut your crop July 15, it will cost as much as $250 more than it would had you harvested June 15.

These figures are not net differences in feed costs because they include only the additional grain you would have to buy for feeding with late-cut roughages. More early-cut roughage would be eaten and the yield of dry matter per acre might be less. Despite this, the total nutrient yield per acre for the season is not greatly affected unless the crop is harvested on about June 1 or earlier in the Northeast.

Generally, when the first cutting is taken this early, the sacrifice in nutrient yield is made up by cuttings later in the season. First cuttings made as early as June 15 in the Northeast contain as much or more total nutrients as first cuttings made at a later date.

Your net savings would be somewhat less than the figures given above, because differences in roughage intakes and costs have not been included. Since cutting time does not enter into the federal hay-grading system (except incidentally), you will not find as much difference in the prices of hays cut at different times as you will in their feeding value.

All of the best forage harvesting and curing equipment in the world and the most perfect weather will not make a good roughage out of late-cut forage.

To put the results of these experiments to work on your farm, it is necessary that you know their limitations. The kinds of forages studied are those commonly used in the Northeast. Some of them were grown in pure stands while others were in mixtures. During a six-year period some of the forages were grown in good growing seasons

and others in drouthy seasons on soils of varying fertility.

If you are located in a different latitude and elevation (where climatic conditions might be defferent) than Ithaca, New York, the values and figures given in the table will not necessarily apply to your forage even though it is cut at corresponding dates. It is possible that some adjustment for season would give you figures which more nearly meet your conditions. But the general effects of time of cutting are the same regardless of locality

It is expected that an exception to this rule would be found in warm areas where plants do not lie dormant during the winter.

Much more research is needed to determine the effects of amount of rainfall, level of fertilization (particularly nitrogen), and length of day and/or amount of daylight. It seems probable that nitrogen fertilization would affect the relationship between cutting time and the protein value of nonlegumes. Information on these points would help us to perfect our prediction tools.

An attempt has been made here to adapt some recent research results to answering some of your feeding problems. This is done by tying to cutting date. If you know the cutting date, amount of legumes, and whether your roughage came from a first cutting or aftermath, you can give your cows just enough feed without wasting.

Benson's Marketing Cost Study

Secretary of Agriculture Ezra Taft Benson has instructed the Department of Agriculture to step up its studies of marketing margins and farm production costs.

"We know that some margins are too great and not justified," Secretary Benson said, "although we recognize that in some instances processors and distributors have increasing costs which they must pay.

"While farmers' prices for food products have been declining, average retail prices of foods have actually risen slightly. The failure of retail food prices as a whole to reflect the decline in farm food products during the past year is recognized by the department as a real obstacle to a solution of the farm surplus problem.

"I have discussed this vital problem with the President. We are agreed that we must definitely determine whether or not prices paid by consumers contain improper or excessive marketing charges and profits. Farmers are entitled to receive the maximum for their products through efficient marketing service." *U.S.D.A.*

When Fire Breaks Out, Help Comes a Mile-a-Minute . . .

Farmers of Sedgwick County, Kansas, can count on prompt help when fires occur. What Sedgwick County has done other counties can do . . .

Condensed from Kansas Farmer

Dick Mann

FIRES occur on Sedgwick county farms just as they do in any other county in Kansas. The difference is that in Sedgwick county a farmer knows where to turn for help. Since the first of 1955, Sedgwick county has had a countywide paid fire department with 24-hour service for every farm in the county. Four new fully-equipped rural fire stations already have been completed and a fifth one is planned.

Now, when a farm fire is reported, modern fire equipment manned by trained, full-time fire fighters is on the way. "It takes us 30 seconds to clear the station and less than 1 minute per mile to reach any fire in the county," says Raymond Davis, chief of the new Sedgwick County Fire Department.

No city fire department is any better prepared, says the Board of County Commissioners. "Our department now has 7 pumper units, four 1,700-gallon tank wagons equipped with front-mount, 600-gallon-a-minute fire pumps, one squad unit that carries 225 gallons of water, and 200 feet of ¾-inch booster line operated by a high-pressure, gasoline-driven pump. Also on the squad unit are mounted generators and lights for night fire fighting. In addition to all this the department has 3-way radio equipment on each truck and walkie-talkies for use of men at the fire site. At one of the 4 rural fire stations the department has a rescue boat, dragging equipment and resuscitator. Chief Davis carries a second resuscitator in his car. It is designed so 3 victims can be treated at a time and can simultaneously be used as a resuscita-

Reprinted by permission from Kansas Farmer, Topeka, Kansas

tor and to administer oxygen.

Rural firemen in Sedgwick county get just as thorough training as do members of a city fire department. "It takes 2 years to train a full-fledged fireman," says Chief Davis. Here is a list of training problems each fireman has to master: forcible entry, ladders, use of all types and sizes of hose, salvage covers (use of tarpaulins over big pieces of furniture to hold down damage,) overhauling (finding all sources of fire and cleaning up), first aid, fire extinguishers, chemical fire hazards, ventilation, rescue practices, Scott air pack (breathing apparatus to allow working in area where men can't breathe natural air), resuscitator, knots and uses, use and care of tools and equipment, use of pumps, fire-fighting tactics, fire practice at training ground, pump practice at training ground, learning locations of roads, hydrants, water sources, chemistry of fire. The men also must attend training films, lectures and demonstrations. They devote some of their time, also, to giving outside lectures and demonstrations. An office chart of training and fire activity of each fireman is kept.

Horses have been rapidly decreasing in North America and Western Europe in recent years, but show increases in the Soviet Union and Eastern Europe.

Altho the present official Sedgwick County Fire Department sprang into being almost overnight the real story of its origin and development goes back to 1948.

That year, recalls Chief Davis, Sedgwick lost 2 or 3 county bridges by fire. Mr. Davis, an employee of the county highway department, says: "We had no fire protection for county property so we started looking around for some kind of apparatus. The city of Wichita had just bought some new equipment so the county purchased an old pumper truck for $400, plus some of our used road equipment. We then built onto the pumper truck a 500-gallon tank.

Farmers Wanted Help

"We never intended to use the equipment except to protect county-owned property," Mr. Davis says. "Then farmers found out we had the truck and started calling in when fires occurred. The city arranged to have all rural fire calls transferred to the county highway department and fellows around the shop volunteered their services as firemen. Late that year the county highway employees organized a crew of fire fighters on call 24 hours a day as volunteers. The county paid their regular hourly wage

when they were out on fire calls but that's all the pay they received.

"We soon got so many calls our one truck was not enough.

The stork delivers a new citizen every 8 seconds. Every 21 seconds the Grim Reaper cuts 1 off. An immigrant arrives every 2 minutes, and every 17 minutes 1 person leaves the United States. The actual net gain is 1 person every 12 seconds, 5 a minute, and 300 an hour, 7,200 a day.

A check of equipment disclosed a county core-drilling truck was not being used constantly so we put some additional hose on it for fire use. We also rigged up some water tanks for big rural fires.

"Late in 1949 the county commissioners bought a 500-gallon pumper truck. This truck was equipped with 1,000 feet of 2½-inch hose, 700 feet of 1½-inch hose and 500 feet of booster line on double reels. The truck also carried ladders. We started making runs with this truck, using our previous equipment as a secondary truck. Since we were handling suburban as well as farm fires our calls began to climb. They jumped from 200 to 300 a year and finally, in 1954, to 500.

"In 1950 the commissioners bought a second 500-gallon pumper and increased its capacity to 600 gallons. We also conceived the idea of building up a pick-up truck for fire use. On it we put a 100-gallon tank, a garden hose, a 50-gallon-a-minute pump, a 250-watt generator and a mounted floodlight. We used this truck to supplement other equipment on grass fires and for preventing spread of farm fires from one building to another. We carried 1,000 gallons of water on 2 trucks but were still handicapped for water. Late in 1950 the county bought a 1,700-gallon tank wagon we equipped with a 500-gallon-per-minute pump."

It is interesting to note the volunteer Sedgwick county fire department had no legal status. Then, in 1953, the Kansas legislature passed a bill whereby any county can own and operate a county fire department. This bill gave the county commissioners power to set up fire districts or to organize a fire district if 60 per cent of the district's resident landowners petitioned for one.

At current prices, the economists figure the average industrial worker earns the price of a pound of round steak in 29 minutes. In 1929 it took 49 minutes.

Opinion Favored Fire Department

Many petitions came to the county commissioners requesting a Sedgwick County Fire Department be established. On June 25, 1954, county comissioners held a hearing as provided by law. The Sedgwick county Extension service carried on an intensive educational campaign on the need for a fire department and urged farmers to attend the hearing. Opinion at the hearing was overwhelmingly in favor of a county fire department.

As a result, county commissioners passed a resolution declaring the entire county as the No. 1 fire district.

County commissioners borrowed $300,000 to set up the new county fire department and made a budget of $180,000 for 1955 operation. Under the law the commissioners issued no-fund warrants covering a 5-year period to purchase equipment, erect buildings, pay salaries. These warrants will be retired over a 5-year period thru taxation with the levy being 2 to 2¼ mills the first 5 years. The levy then will be lowered to cover only annual operating budgets.

It was decided immediately to build 4 rural fire stations, and Chief Davis was given the job of locating these. He took into consideration population centers, insurance credits and access to roads leading from Wichita to various parts of the county. At present there are stations north, east, south and west of the city limits. A fifth station will be erected near Garden Plain, in the west central portion of the county.

It is too early to fully assess the value this county fire department will be to farmers and other rural residents. Already, existence of the department, which has a class-A plus insurance credit rating, has resulted in substantial reductions in fire insurance rates. On yearly premiums the reduction is 6 cents per $100 valuation for a 10-mile radius of each station, and on 3-year policies it is 15 cents on $100. For 5-year policies it amounts to 24 cents on $100. More important than rate reductions to the farmer, perhaps, is that he no longer is restricted on amount of fire insurance he can carry. Before the department was established farmers could insure against fire for only a small per cent of the actual value of their buildings.

Made an Impressive Record

Savings in actual fire losses should be great, too, altho they cannot be determined as yet. In 1952, when the department was still on a volunteer basis and operating out of a single station, it made an impressive record. That year the department answered 490 alarms in which the potential

property valuation loss was estimated at $4,319,360, and the potential insurance loss was $3,495,220. Due to services of the department in controlling these fires, actual insurance loss totaled $138,155.65 and property loss $274,223.15. It was this impressive showing that led farmers to support the new county fire department when the decision came up in 1953.

Every effort is being made by the new department to inform farmers on how to use the new service and to speed arrival of trucks at farm fires. New rural phone directories are being distributed to all farms this summer by members of the fire department. On the front of each phone book will be instruction stickers on how to turn in a fire alarm. The phone book will pin-point every farm as to the quarter section on which the farmstead stands. Each fire station also keeps a bulletin board on which is kept a daily record of all rural road repairs and bridges out so firemen can reach any farm with a minimum of delay.

BIG COWS SHINE IN RANGE TEST

Eight-year results of a New Mexico A&M College experiment show that in weight-for-age selections, large Hereford beef cows—long legs and body—hold the edge over compact cows of the same breed.

John Knox, of A&M's animal husbandry department, says the study indicates that large cows stay in the herd almost a year longer than the compact type. In calving percentage, the larger cows bested the others by 10 per cent, with a 96.5 per cent calving record.

The margin continues at weaning time—93.8 per cent calves weaned from large cows, compared with only 81.6 per cent for the smaller compact animals.

On a herd lifetime average, the large cows produced 1½ more calves.

On an average for the entire breeding herd, the weight of calves from large cows averaged 100 pounds heavier than the calves from compact cows.

When the calving figures are interpreted on the basis of average calf weight for each 1000 pounds of cow in the herd, the advantage for the large cows is still 47 pounds more calf output per animal. Calves from larger cows show the highest average daily gain, too.

Sure, big cows eat more, but only in direct proportion to the difference in body weights between large and compact cattle, the test shows. *New Mexico A. & M.*

Australia . . . Agricultural Wonderland

High production per man keynotes agriculture in the land down-under . . .

Condensed from Nation's Agriculture

L. V. Toyne,
former Agricultural Attache in Australia

YOU have probably heard otherwise, but, believe it or not, this land "down under" is one of the easiest places in the world in which to make a living, provided you have a little capital plus the fortitude to hang on and push yourself ahead.

Little did the English dream that this so-called desert area called Australia would produce 50 per cent of the fine wool of the world, become one of the leading exporters of wheat, be able to furnish the homeland with all kinds of dairy products, red meat (lamb, mutton and beef), fresh fruit, dried fruit, wine, and a host of other things.

Australia is a country just under the size of the United States.

One-third of it is desert waste, with practically no inhabitants except roving bands of Aborigines. From 40 to 50 per cent of it is in a low rainfall area, thus it is low producing and has few inhabitants. Then there is a relatively small area which receives ample rainfall to produce feed for livestock as well as other crops.

Australia, as we all know, lives off the back of the sheep. The Australians produce over 50 per cent of the fine wool of the world and are unexcelled in quality of production. Because they are so far from market, they have had to become very meticulous in the preparation of their clip for world markets.

All their wool is sold by public auction and must be prepared in the way prescribed by the industry and the government when offered for sale. Any wool not prepared in this way must be resorted at the producer's cost and re-offered for sale at the auction.

The sheep population of Australia today is about 130 million head, 85 per cent of which are Merinos and used for wool pro-

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duction and 1.5 per cent cross-breeds used for meat production. The average clip is better than nine pounds per head and yields better than 60 per cent. If the disease, myxomatosis, continues to destroy the rabbits, the sheep population will soon move up to 150 million head.

Australia's present agricultural industry is entirely built around a grazing economy. Its production per man in the wool industry, dairy and wheat is probably as high as any area in the world.

The country does not have a large acreage of wheat, but it ranks in the top three nations as far as exporting agricultural products is concerned. The usual milling quality of Australian wheat has been low.

The Australians, therefore, compete with the Pacific Northwest and those low gluten content producing areas in the United States for markets. It appears that in the past, Australian plant breeders have been more interested in developing high yielding strains rather than good milling strains. However, the trend the last few years has been away from the high yielding strains to better milling quality.

The northwest tablelands in New South Wales and the Darling Downs in Queensland raise some of the best quality wheat in the world. It is common to find the protein content of wheat in these areas ranging between 12 and 15 per cent and going as high as 19 per cent.

The Australian wheat crop is usually planted in June. Spring varieties are sown because the ground never freezes and the crop is harvested from November on.

Australian dairymen, in general, have been slow to recognize the need for pasture improvement and the use of supplemental feed during dry periods in the summer or short cold periods in the winter when pastures are not producing what they should.

Most of the dairy products are marketed by cooperatives, working with the government which contracts with the United Kingdom. All of Australia's rice is produced in the low rainfall areas, relatively close to the only river that has its origin inland and finds its way to the sea. It takes about seven acre feet of water to produce an acre of rice.

Australia also competes with the United States for a dried fruit market and has at times, because of certain contracts with the British Empire nations, cut in on our market.

Australia produces some of the best wine in the world, too, and is being recognized for it.

America's chances of disposing of surplus agricultural commodities in Australia are slim. Be-

cause of her close ties with the United Kingdom, Australia is a soft currency country. We do furnish her with most of the cotton and tobacco she needs.

We purchase certain minerals such as copper, lead, zinc, and radioactive sands from her. We also purchase wool, kangaroo and rabbit hides. A large portion of the dollars that Australia has been able to earn goes toward the purchase of petroleum and its products.

If she could discover some good oil fields which would furnish her own needs, America would be able to sell more automobiles, trucks, and farm machinery to her.

The Australians do have one oil discovery in the remote region of middle West Australia.

It is possible that at some future date, if livestock becomes valuable enough to be saved during a drouth period, we may be able to furnish certain protein supplements in small quantities.

The Australian farmers' general tax load, such as ad valorem taxes, is low and they are thus able to produce at a lower cost than are farmers in this country. Income taxes, however, are very high.

The country people in Australia are like our country people in that they are the salt of the earth.

Multiple Farrowing Would Steady Hog Prices

A steady supply of hogs for market throughout the year is the goal of the National Swine Growers Council in recommending that farmers set up a multiple farrowing program in hog raising. The Council suggests that many farmers will find it convenient to farrow two groups of sows twice a year with farrowing dates set 90 days apart.

The biggest single advantage claimed for that system would be more orderly sale of hogs with less seasonal price fluctuations often due to heavy market runs. The practice also would level the sow market. Sow supplies now vary from 50 to 5 per cent of the total receipts according to the season.

Multiple farrowing has another advantage in easier, more efficient hog raising. Smaller groups of sows farrowing at intervals will make more efficient use of farrowing and feeding equipment and will result in market hogs more uniform in size.

University of Wyoming

Beef Producers' Stake in Eradicating Brucellosis

This disease reduces calf crop 15%. Progress in eradication is being made in many states . . .

Condensed from
American Hereford Journal

Dr. J. R. Pickard

IF YOU are a producer of beef cattle, how well will it pay you to take part in the national brucellosis eradication program?

Perhaps you have said that brucellosis is a problem in dairy herds, but as a beef producer you can't see how it affects you. You don't see why you should take part in the eradication program. Let us consider some of the facts before you make a definite decision.

Assume brucellosis strikes a dairy herd. An infected cow loses a calf and 20 per cent in milk production. The herd owner suffers these losses, but he still gets 80 per cent milk production from his infected cows. Of course, the use of this production is being greatly restricted by the increasing number of communities enforcing regulations requiring that milk for human consumption come from brucellosis-free herds.

But, if you own a range herd, your principal interest is producing calves. When brucellosis strikes, you lose 15 per cent of your calf crop from brucellosis-infected cows. That loss is complete.

Can Come From Any Direction

Perhaps you can say that you have no brucellosis in your herd and average a 98 per cent calf crop every year. Then you are in good shape and we only hope you can stay that way. But no one can be sure about next year or next month or next week as long as sources of infection remain anywhere in the country. Our livestock industry is highly mobile and our methods of transportation are fast. The disease could come from any direction. As long as brucellosis exists, there is the possibility that your herd may be next.

You may say you vaccinate

Reprinted by permission from American Hereford Journal, Kansas City, Missouri

your calves and that is your insurance against brucellosis. Vaccination is an important tool in the battle against brucellosis while the disease is widespread. It is a good "hold-the-line" measure. But vaccination alone has never eradicated an animal disease. Furthermore, no vaccine yet devised against any disease of animals or man can be considered 100 per cent effective in all individuals.

Strain 19 vaccine against brucellosis does build up resistance in your herd when used in conjunction with sound sanitary practices. In a large per cent of the animals vaccinated with Strain 19 vaccine, serviceable protection is provided indefinitely against normal exposure to brucellosis.

In a recent study by the Soil Conservation Service, 83 per cent of South Dakota farmers interviewed indicated crop yield increases due to use of shelterbelt windbreaks averaging about 8½ bushels per acre.

But as long as the disease exists, you must vaccinate your calves every year at the proper age if you are to get the protection of the immunity it builds. The recommended age for calf vaccination is six to eight months, but is permissible up to 12 months of age in beef breeds under range or semi-range conditions. It is a perpetual practice with no end in sight, unless it is coupled with eradication measures. Once brucellosis is eradicated, you can dispense with perpetual vaccination.

Consider Comparative Costs

The cost of an accelerated brucellosis eradication program that can wipe out the disease in a relatively few years is a drop in the bucket compared with the cost of living with brucellosis indefinitely with its losses and control measures.

The objective of having a clean herd in a clean area is becoming increasingly important. Stringent laws and regulations are being enforced by various states to restrict the movement of cattle from herds and areas that have not been officially declared free of brucellosis into herds and areas that have already been certified. These restrictive measures are necessary and important to hold the ground that has been gained in the fight against the disease.

Under the rules for maintaining certified areas adopted by the U. S. Livestock Sanitary Association and approved by the U. S. Department of Agriculture, any cattle moved into certified areas must meet one of the following qualifications, expressed

here in general terms:

1. Cattle from officially certified brucellosis-free herds, or cattle from negative herds in modified certified areas which have passed a blood test within a year of shipment.

2. Cattle from herds under official supervision and negative to a blood test within 90 days of shipment.

3. Cattle under 30 months of age, officially vaccinated, (a) without test if they come from brucellosis-free herds or (b) if from herds under official supervision they must pass a blood test within 90 days.

4. Officially vaccinated breeding cattle over 30 months of age must be negative to blood test within 30 days of shipment under the new interpretation of the blood test for official calf vaccinates.

5. All other cattle over 6 months of age (except steers, spayed heifers, and cattle for immediate slaughter) must pass a blood test within 30 days of entry.

(Note: The above represent the rules governing interstate shipment of cattle at the time this article was prepared. Changes in the regulations are under consideration which may vary from the above if and when they are adopted.)

Ready to Go!

Orange ear-tags instead of only a certificate, are beginning to show up on brucellosis-vaccinated heifers at sales and shipping points. Under the system, each tag is numbered and the animal that bears it is positively identified.

The idea of using the specially colored tags is catching on rapidly at the Kansas City market. Now, when a shipment of orange-tagged heifers comes to Kansas City, buyers know they are "ready to go" to any state. In addition to saving time, the system saves money. It costs about $100 a carload to test the cattle when in transit. Also, out-of-state buyers are willing to pay more for a bunch of heifers if they know they're ready to ship.

USDA officials recognize the value of the positive identification the orange tags provide. They have suggested that the tags be used nation-wide.

The number of certified-free herds and modified certified-free areas is increasing rapidly as a result of a speed-up in the eradication program authorized by Congress in 1954. The first few months of the expanded program have shown effective results. Many herds and areas are being certified for the first time and several entire states are approaching the point of being declared brucellosis-free.

May Mean a Lower Price

Buyers sometimes are not willing to pay as much for animals that cannot be moved freely from area to area or state to state. In other words, it may mean that you will get a lower price for animals that do not come from

a herd or area that has been declared brucellosis-free. The market for some of your animals may be closed entirely in these certified areas.

After you and other cattle owners in your area have balanced all the facts one against the other, you may decide that it is an economic necessity to be certified under the brucellosis program. What would you have to do to reach that status?

A University of Minnesota safety specialist says the danger of overturning a tractor increases four times when speed is doubled.

In a range or semi-range area, you must meet the following requirements:

1. Test all purebred cattle by the blood agglutination test.
2. Test all dairy cattle by the blood agglutination test. (Three negative milk tests, reported at not more than six-month intervals, may be used in place of the blood test in any strictly dairy type herds that may be located in the area.)
3. Test at least 20 per cent of other cows over three years of age by the blood agglutination test. (No test is required for cows other than dairy and purebred under 3 years of age.)

To show how these requirements would work out in practical application consider an example of a herd in the area that might consist of about 240 animals:

When the area reaches the modified certified status (not more than 5 per cent of the herds infected and not more than 1 per cent of the cattle infected), it may be declared brucellosis-free. Any infected herds left in the area would be held under quarantine restrictions required by the state until freed from the disease.

At the end of a three-year period, the area must be re-certified by testing at least 20 per cent of the herds by the blood agglutination test. The same type animals as required for certification must be tested: All dairy animals, all purebreds, and 20 per cent of other cows over three years of age.

In both certification and re-certification, if infection shows up in testing a herd, the entire herd must be tested and re-tested until the infection is eradicated.

How Good Is The Test?

Since the certification of range areas depends upon the results of the blood agglutination test, you might well ask what it is and how good it is.

In simple terms, the blood ag-

glutination test is based on the presence of Antibodies, caused by the Brucella organism, in the blood stream of the animal. A blood sample is taken from an animal and brought into contact with a test fluid, called an antigen, containing killed Brucella organisms. If there are antibodies or agglutinins in the blood sample, the Brucella organisms in the antigen will clump. This is a positive reaction known as agglutination. According to the degree of agglutination and the dilution of the antigen, the animal is designated as "suspect" or "reactor." If there is no clumping, the animal is considered free from brucellosis, or negative.

Wheat consumption per person in the United States has declined from 310 pounds in 1909 to an estimated 173 pounds in 1955.

The official blood test is made in a state or federal laboratory and may be conducted by either of two methods: The tube method which requires 48 hours of incubation, or the plate method which can be completed in about 10 minutes.

Sometimes animals vaccinated with Strain 19 vaccine, particularly if they are vaccinated as adult animals, will show a positive reaction to the test as a result of vaccination and not infection. This has been a confusing factor in making an accurate interpretation of blood tests of vaccinated animals. However, recent research conducted by the U. S. Department of Agriculture in cooperation with disease control officials of Illinois and New York has developed a new interpretation of the blood test that allows for this factor.

In test application, the new interpretation reduced by three times the number of animals classified as reactors, reduced by nearly one-half the number classed as suspects, and increased by five times the number of animals testing negative. This method does not affect the interpretation of tests on unvaccinated animals. It has now been incorporated in the official eradication program.

Cost account records show that about a 17-bushel yield is needed to pay the cost of producing an acre of soybeans in the midwest.

The second part of the question is "How good is the blood test?" When properly performed, the blood agglutination is a reliable means for diagnosing bovine brucellosis. A check test conducted by the U. S. D. A. over the past seven years to determine the uniformity of results obtained in the field, showed

that 91.88 per cent of the tube test interpretations and 91.07 per cent of those made by the plate method agreed with the standard Beltsville interpretation.

Can Program Succeed?

You may have still one other question. You may agree that it is an economic advantage to eradicate brucellosis in your state and in the nation, but can such an eradication program be made to work in range areas? It can work and is working in several beef-producing states. To take one outstanding example, consider what Montana has done within the past year. The following table gives a comparison of the progress being made in Montana in May, 1954, with that of May, 1955:

	May, 1954	May, 1955
Herds tested	882	1,155
Cattle tested	22,871	35,266
Per cent infection ..	1.8	1.6
Calves vaccinated .	22,282	31,037
Counties certified .	2	9
Herds under supervision of an official plan	4,573	15,796
Cattle under supervision	167,766	528,822

The same sort of progress is being made in many beef-producing areas. It is up to you and your neighbors whether or not you want to eradicate brucellosis. We believe you will find it pays in dollars and cents as well as in eliminating a serious human disease hazard, undulant fever.

Ensiling Beats Field Curing in Preserving Alfalfa

Ensiling alfalfa is a far better way than field curing to preserve alfalfa for dairy cattle feed, according to I. W. Slater, Wyoming extension dairyman.

Compared with a field-cured crop, alfalfa as silage contains much more food value for dairy cattle. Feeding the silage results in higher-quality milk containing more carotene and Vitamin A.

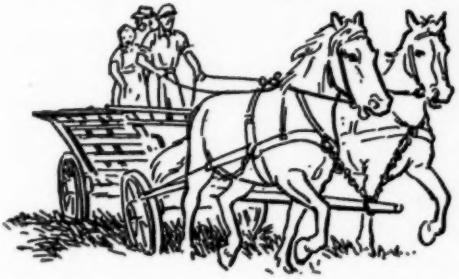
Recent 5-year trials compared field curing of alfalfa with preserving the forage as silage. The trials showed that field curing saved the fewest nutrients even under ideal weather conditions.

Rainfall during the field-curing period reduced the dry matter saved to 30 per cent below that saved by the ensiling method. The tests showed also that field curing caused 2.7 times more leaf loss and 2.8 times more dry-matter loss than did ensilage making.

Putting up alfalfa as silage provides a good way of handling heavy, weedy first cuttings harvested during cool damp weather. Dairymen can store it chopped or long in a variety of silo types.

University of Wyoming

IFYE Delegates Spread Goodwill



International Farm Youth Exchange delegates build international understanding and goodwill . . .

Condensed from
National 4-H News

Barbara Funkhouser

THE International Farm Youth Exchange (IFYE) has sent 629 young men and women into 45 countries since 1948.

While IFYE is sponsored by the National 4-H Club Foundation and the Extension Service, it is privately financed and the average cost of sending one U.S. delegate abroad and having one foreign exchangee in the U.S. is $2,000. Of this, $700 is raised within the state and the remainder comes from contributions to the Foundation.

But what is a U.S. IFYE? A delegate is 20 to 30 years old, with a farm background, high school education, rural youth organization experience, unmarried, in good health, willing to devote much time and energy in preparation and in sharing the experience with others, and most important, has a sincere desire to understand other people.

Statistics on the 119 who went from 37 states in 1955 indicate that the average delegate is about 22 years old and has about three years of college. Of the group, 83 per cent have lived on farms all of their lives, 61 per cent had high school agriculture or home economics, and 88 per cent were 4-H'ers.

The question of what an IFYE does overseas is difficult to answer because every delegate in every country has a different experience. In 1954 delegates lived with an average of five families for 19 days each but this figure does not tell of those who lived in schools and in rural camps part of the time.

The ideal IFYE situation is one in which the delegate lives for several weeks at a time as a member of various host families within one country. Thus, there is the opportunity to reach a high degree of understanding

Reprinted from National 4-H News, Chicago, Illinois

at this basic level of society. He is to be neither guest nor hired hand but shares the work and pleasure as a son.

However, delegates do not meet these experiences "cold." After receiving a country assignment, they study its language, history and customs, write to former delegates and get first-hand information from people who have been there. They also have much to learn about the U.S.A.!

Before going, delegates have a week of intensive orientation. Those leaving the east coast report to Washington, D. C., for conferences with the 4-H Foundation, State and Agriculture Departments, and foreign embassies. Groups going to the Pacific are orientated in California.

When they return to the U.S. some three to six months later "evaluation" sessions are held so that each year's experiences mean improvements in the program.

For example, 13 countries now receive only male delegates, thus placing a heavy burden on the limited supply of available men. In 1955, women were assigned to Turkey and India for the first time, so perhaps this problem will be gradually eliminated.

Tentative 1956 plans call for 161 delegates to go to 56 foreign countries. Orientation programs are now being keyed to specific cultures and areas of the world and there are four seasonal programs rather than just summer and winter departure groups.

There is increased emphasis on "package" exchanges. This means that a delegate from one state goes to a country whose exchanges are often assigned to visit his state. Early experimentation was done with the India and Pakistan programs.

But what of the delegate after he comes home? First is several months of "fast" talking. Some have given more than 100 IFYE speeches and there are 1948 delegates still on the circuit. In addition, radio and TV programs and newspaper stories reach hundreds of thousands of people, thus spreading the peaceful influences of IFYE.

Former delegates may help with the state program, form an IFYE alumni group, and return as leaders in the organizations they previously belonged to.

Of the 119 delegates in 1955, 33 indicated they hope to work for Extension, 25 want to teach, 23 want to farm, 19 are planning graduate study, 12 will work in fields related to agriculture, and 11 want to do social welfare work.

So, what is this "influence of

IFYE" that people talk about? It is the story of a young adult taking himself as evidence of a democratic and peace loving nation into another where misconceptions often reign.

It is the story of rural young people from those countries coming to the U.S. and seeing us as we live, work and play. From this experience is evolving the philosophy that all the people of the world are similar in heart although superficial surface appearances may seem very different.

Sheep Can Be Profitable

A flock of sheep can be a very profitable addition to the livestock program on many farms, says L. J. Kortan, South Dakota State College.

This was demonstrated by the Wisconsin Experimental Farm. In 1956 they purchased old western ewes. Since then purebred rams have been used so that at present the flock is high-grade Shropshires. It is run as a commercial flock with good management practices. This is indicated by the size of the lamb crops born and saved, points out Kortan. Parasites are controlled so that thrifty well-doing lambs are marketed at a desirable weight and finish for age.

This station has done what any farmer can do. In fact, the purpose of this flock is to demonstrate what can be accomplished by good care with a farm flock. Their results make one believe that a flock of sheep may be the answer for many farmers who are looking for ways to expand their operations that may have been curtailed by cuts in acreage or other livestock production.

The financial statement for 1952 which is typical for previous years, follows: From the flock of 88 ewes they had an income of $3,024.71. This was from the sale of wool, lambs and some ewes sold. The expenses on this flock for feed, pasture, shearing and miscellaneous was $1,316.25. This gave a return of $1,708.46 from the flock above expenses or a return of that amount for the labor. In other words, a return of nearly $150.00 per month to the owner for the labor of taking care of them after all expenses were paid.

How this good return was accomplished is realized by study of the flock record for the same year, stated Kortan. From 88 ewes, 152 lambs were born; 140 lambs were raised. Thus 1.59 lambs were raised per ewe on the average. *South Dakota State College*

Use of Herbicides in Conservation

Recent research brings out new factors in controlling weeds through herbicides . . .

Condensed from Soil Conservation

W. C. Shaw and *Marion W. Parker,*
Agricultural Research Service, U.S.D.A.

WEEDS are pests that most farmers cannot afford. The losses caused by weeds on farms in the United States have now reached an estimated 4 billion dollars annually. These losses are estimated to be second only to farm losses caused by soil erosion.

Weeds compete with crops for water, light, and mineral nutrient. They increase the cost of labor and equipment, reduce the quality of farm and livestock products, harbor insects and diseases, and impair the health of livestock and humans. Some weeds are especially competitive. The average ragweed plant has a water requirement three times that of corn. One plant of common mustard requires twice as much nitrogen, twice as much phosphorus, four times as much potash, and four times as much water as a well-developed oat plant.

Economical, practical, and effective weed control is a necessary requirement for successful farming.

An important objective of the research program of the Department of Agriculture is to develop weed control principles and practices that will result in reducing the losses caused by weeds.

Weed investigations include studies on cultural, ecological, chemical, mechanical, and biological methods of control. There are four broad general areas of work: (1) Research on the evaluation of chemicals for their herbicidal properties, including studies of factors affecting the efficiency of chemicals as herbicides; (2) physiological and ecological studies on weeds and crops in relation to methods of weed control; (3) research on weed control in cultivated crops, including field and horticultural crops on nonirrigated and irrigated lands; and (4) research on weed control in pastures and on rangelands and noncultivated areas. This research is being con-

Reprinted from Soil Conservation, Washington, D. C.

ducted at 29 locations in cooperation with the Soil Conservation Service, Forest Service, Department of Interior, and 23 State Agricultural Experiment Stations.

In the past decade there have been many significant developments in the control of weeds by chemicals. Some of those most closely related to soil and water conservation include: (1) Reduced tillage in those crops for which satisfactory chemical weed control practices have been developed; (2) chemical treatments as pasture renovation aids; (3) chemical control of brush and weeds as a means of increasing the productivity of pastures and rangelands; and (4) the conservation of water through the efficient control of weeds in irrigation channels and drainage ditches and on ditchbanks.

How does the use of herbicides aid in soil conservation? A 3-year cooperative investigation on cultivation and weed control practices in potatoes conducted by Agricultural Research Service, U. S. Department of Agriculture, and the New Jersey Agricultural Experiment Station help supply some of the answers.

Potatoes are intensively tilled in the Eastern United States. Tractors and other equipment are used from March to October. During that time the soil may be plowed and harrowed several times before planting. After planting, ridges are harrowed off, potatoes are cultivated 4 to 8 times, sidedressed, sprayed 5 to 9 times, and sometimes chiseled. Vines are killed by spraying or beating, potatoes are dug and hauled. Finally the field is disked and planted to a cover or other crop. These operations result in about 20 to 25 miles of travel on each acre in a season. This is intensive farming.

The use of herbicides makes it possible to reduce this traffic by reducing the amount of cultivation needed to control weeds.

In the research studies, the yield of potatoes varied with the number of cultivations and the extent of damage to soil and crop from excessive cultivation. The results indicated that when herbicides were used to control weeds not more than two cultivations were required for maximum yields. Yields were actually lowered by excessive cultivation in 2 out of 3 years. In these studies the herbicide DNBP (4, 6-dinitro ortho secondary butyl phenol) as a pre-emergence spray controlled the weeds for 4 to 6 weeks after potato emergence, eliminating the need for cultivation during this period.

Any traffic or machinery on soil tends to compact it. This is also true of cultivators. Although the cultivator loosens the surface soil, that in the root zone is actually compacted by the ma-

chinery. During the 3 years of this study, soils that were cultivated once had an average weight of 95 pounds per cubic foot, whereas those cultivated 5 to 7 times weighed 98 pounds. One hundred thirty thousand extra pounds of soil were packed into the surface foot of each acre.

It is not merely the packing of soils that is detrimental to plants growing in them. Other effects accompany the compaction. Air space, for example, is reduced. The part of the soil filled with air is a measure of aeration. It is the space through which plant roots get oxygen from the atmosphere and through which carbon dioxide filters out of the soil. Five to seven cultivations reduced the soil air space by 15 per cent in the 2 years of measurements.

Possibly 50,000 farms were absorbed by the farm-enlargement process in 1954, reports the U.S. Department of Agriculture, with about a third of all farms and farm tracts sold being bought for the purpose of farm enlargement. During the same year, about 10,000 new farms were established from parts of existing farms.

Compacting wet soils also crushes and destroys soil granules or aggregates or particles. When these are destroyed there is increased tendency toward muddiness of the soil when wet, and crusting and cloddiness when dry. Aggregation tests on many samples showed that minimum cultivation left the soil in better tilth.

It should be pointed out that wet soil is compacted much more easily and to a greater degree than dry. Most potato cultivation is done in early spring when soils are relatively wet. Preemergence spraying with chemicals not only saves labor and cost of cultivating but makes it possible to stay off the land for 5 to 6 weeks after application. This is precisely the time when greatest damage usually occurs from cultivation. The cultivations that were found necessary were needed later in the growing season when the soil was usually drier.

It is believed that the reduced potato yields which resulted from 5 to 7 cultivations were a direct result of damage to the soil structure and to potato roots. The damage to soils is not corrected simply by plowing the next year. It is cumulative. Loss of soil productivity by damaged soil structure is correlated slowly and only with the greatest care in applying good soil management practices such as rotations, cover crops, and proper tillage.

This is but one striking ex-

ample of the relationship between chemical weed control, good soil management, and soil conservation. The use of preplanting and pre-emergence herbicides for the control of weeds is also making it possible to plant and grow corn, sugar beets, and other crops with less seedbed preparation and with fewer early cultivations.

The increased effectiveness and lower cost of some of the newer herbicides have resulted in the development of a new principle in pasture renovation. Low rates of sodium trichloroacetate (TCA), sodium 2,2-dichloropropionate (dalapon) and 3-amino-1, 2, 4-triazole and various mixtures of these herbicides with 2,4-D may be used to kill old Kentucky bluegrass sods and other undesirable sods and plants, on soils where tillage operations are ineffective, or where critical slopes increase the hazards of soil erosion if effective seedbed preparation by tillage is practiced.

The effective use of herbicides to assist pasture renovation makes is possible to replace unproductive sods on steep slopes and on stony soils that cannot be renovoted by conventional tillage equipment or seedbed preparation techniques. In recent research studies when herbicides were used to kill existing sods, only two diskings for seedbed perparation were required to give highly successful stands of a Ladino clover-orchardgrass mixture, alfalfa, birdsfoot trefoil, and other forage species. When herbicides were not used as renovation aids, 10 to 12 diskings were required for seedbed preparation that gave equally satisfactory forage stands.

Millions of acres of rangelands are being invaded by mesquite, sagebrush, sand sagebrush, shinnery oak, juniper, rabbit brush and other weedy range plants. Herbicides are being used on over 2¼ million acres of pastures and rangelands for the control of weeds and brush. Results of recent studies indicate that effective chemical control of weeds and brush on much of our rangeland would increase the production of desirable forage species 40 to 80 per cent. Much additional research is needed to develop control practices for some of these species. With increased research and the continuous development of more effective herbicides, there will be more opportunities for reclaiming these weedy areas and increasing the productivity of weed and brush-infested rangeland.

Most weeds normally use larger quantities of water in their growth processes than do most cultivated plants. This water is not available for use by economic crop plants and thus there is a serious loss in agricultural production. Weeds in irrigation can-

als and drainage ditches of the Bureau of Reclamation's 14,075 miles of irrigation systems are estimated to result in a loss of more than 150,000 acre-feet of water each year. Add to this amount another 60,000 acre-feet of water lost annually due to salt cedar and other weed infestations along other irrigation sources such as rivers and reservoirs, and the total value of the water loss probably exceeds 3 million dollars annually.

Project these water losses to all irrigation systems in the western region involving approximately 120,386 miles of unlined canals, and the estimate of annual water loss due to weeds exceeds 1¼ million acre-feet.

The use of aromatic solvents and other chemicals for the control of submerged water weeds in irrigation canals in the West is rapidly being accepted as necessary for proper management. Recent research has shown that several new chemicals, including 2,2-dichloropropionic acid and 3-amino-1,2,4-triazole, may prove more effective for the control of cattails, phragmites, and other ditchbank weeds than some of the present treatments.

Farmers have demonstrated outstanding interest in the use of chemicals to control weeds. Herbicides are being applied on an average of 1 out of every 10 acres of cultivated land in the United States. It is estimated that over 85 million pounds of herbicides were used for weed control on agricultural and nonagricultural lands in this country in 1952. Of the total acreage sprayed and dusted for weed, insect, and disease control, more than half was sprayed for weed and brush control. In 1952, a total of 33.5 million acres of agricultural lands were sprayed for weed control, as compared with a combined total of about 29 million acres sprayed or dusted for insect and disease control. The total sprayed for weed control included approximately 18 million acres of small grains (wheats, oats, rye, barley, flax, and rice), 9.5 million acres of corn, 2.5 million acres of pasture and rangeland ,and over 2.5 million acres of other crops.

About 70 per cent of the acreage sprayed for weed control was treated by farmers using their own equipment. The cost of chemicals on this acreage amounted to about 26 million dollars. On the remaining 30 per cent of the total acreage, custom operators furnished and applied the herbicides at a cost of 22 million dollars. Thus, in 1952, American farmers were paying a total of 48 million dollars annually for the control of weeds on their farms. This gives some indication of the use of chemicals and the cost of weed control on agricultural lands.

The Story of Artificial Breeding Research

This article from a British publication traces the development of A. I. from the earliest beginnings to the deep-freeze techniques of today . . .

Condensed from The Agricultural Review

IT has been recorded that the Arabs, in the dim distant past, used a method of artificial insemination for their horses. The first scientific experiment, however was done in 1780 at Milan by Spallanzani who inseminated a bitch. This was, at the time, regarded as an important demonstration of the facts of life, but no practical use was made of the discovery until a much later date.

About 1890, Heape in England and Ivanoff in Russia began to develop the method, particularly for the cure of certain forms of sterility due, for example, to closure of the cervix in horses. As such it continued to be used, in veterinary practice, until about the time of the first World War. After the war, in view of the depletion of livestock caused by it, the application of science to animal production was intensified and, as one aspect of this intensification, attempts were made to develop artificial insemination as a means to the more rapid improvement of farm animals.

Most of the earlier experiments were made on small animals, because of small cost and the high speed at which results could be obtained. In order to increase the number of young which a male of high genetic value could produce, it was first necessary to be able to keep the sperms alive and fertile, outside the body, for the time required to transport them to the females. It had already been found in rabbits that while sperms remained fertile in the female tract for only some 30 hours, they remained fertile in the epididymis of the male for about 40 days, one of the important factors being the lower temperature of the epididymis. Walton at Cambridge then showed that the optimum temperature for the survival of sperm, outside the body, was about 40°F

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and in 1925 rabbit sperm was sent by parcel post in a thermos at this temperature from Cambridge to Edinburgh, where three does were successfully inseminated.

The next advance in the application of artificial insemination to farm animals came, about 1930, from a group of workers—Milovanov, Neumann and others—in U.S.S.R. They invented the artificial vagina for collecting from the male and new apparatus for inseminating the female, and they devised special salt solutions for diluting the semen of the several species of farm animals.

They kindly supplied Cambridge with their apparatus and, by its use together with the methods of keeping the sperm alive outside the body, Walton at Cambridge in 1934 successfully sent Suffolk ram sperm to Prawochensky in Poland. In 1936 Siebenga, in Holland, successfully sent bull sperm to Edwards in England.

Early experiments soon showed that the semen of our farm animals falls into two distinct classes—on the one hand, that of the bull and ram which, although small in volume, keeps very well outside the body, and on the other, that of the stallion and boar, which is larger in volume but has very poor keeping qualities. This explains why practical application has been easy in cattle and sheep, whereas in pigs and horses little progress has been made until recently. About this time, too, Bonadonna in Milan (where Spallanzani had made the first experiment in the 17th century) set up a laboratory for the study of A.I. and became active in promoting its development.

At this same time, despite the fact that many cattle had been successfully inseminated at experiment stations in Cambridge and Reading and very large numbers, under farm conditions, in the U.S.S.R., British authorities still regarded it as 'a spectacular scientific experiment which could have little use in practice', and no steps were taken to develop the technique for commercial use. The Danes, however, saw a use for it in connection with their Bull Progeny Testing Scheme; after initial experiments by Sorensen on some heifers in Copenhagen, and on a State farm in Jutland, they set up the first commercial A.I. station on the island of Samsoe in 1936. The sponsor was R. Gylling Holm, who is now President of the Danish Federation of A.I. Centres. The Veterinarian in charge was Alex Larsen who first used the 'rectal'

Dairy daughters of Illinois cooperative breeding association bulls have averaged 448 pounds of butterfat a year since 1943.

method of insemination to replace the vaginal speculum method which was then in use.

In the following year Perry from U.S.A., who was visiting Denmark, saw the station and persuaded Larsen to come over to start the first A.I. station in America at Flemington, New Jersey, in 1938.

The use of A.I. spread rapidly in the United States, and American research workers did much to improve the methods. Up till that time 'temperature shock' to the sperm caused by rapid cooling, as described by Walton, had caused considerable trouble by lowering fertility. In the United States, under commercial pressure to make semen last longer and to bear greater dilution, Lardy and Phillips tested various substances and found that the addition of egg yolk to the diluting fluid minimised the effect of temperature shock. Salisbury too was successful in increasing the practicable degree of dilution and thus increasing the numbers of cows which could be inseminated from a single bull. Whereas in the early days it had been possible to inseminate only about 10 cows from each collection, this figure has now risen to 200 or more. Later these same workers also introduced the method of adding antibiotics to semen.

During the War, because of the short supplies of milk and feeding-stuffs, the improvement of British dairy cattle became an urgent necessity. In 1941 Hammond, Edwards and Walton placed a scheme for commercial A.I. before the newly-formed Agricultural Improvement Council and this, at the second attempt, was accepted. The Cambridge centre opened in 1942 and Reading followed early in the following year.

From England, Edwards and Ritchie, the former from the breeding and organization angles and Ritchie from that of disease control, were sent to the United States to study developments there. Their report laid the foundations for the widespread development of A.I. stations in Britain. The Ministry of Agriculture took steps to control its development, the qualms, and the fears of opposition from the Church and from bull-breeders having been allayed. During this time Henderson, who was then with the Canadian Air Force in England, and who had obtained his experience in the first A.I. station in U.S.A., assisted greatly in getting things going.

Soon the two pilot stations had demonstrated the workability of the system under British conditions. Requests for the setting up of stations, by groups of farmers all over the country, began to come in, but priorities had to be enforced because, as a measure of

disease control, it had been decided that the bulls, after strict veterinary examination on entry, should be housed in isolation from other stock.

The first stations were set up in the areas of densest cow population, where the low mileage traveled by inseminators made up for the economy of the enterprise. In general the stations lost money during their first year, because of the large capital outlay and relatively small numbers of cows inseminated; during the next year they broke even, and, in the third, they began to make profits. Subsequently the whole country was covered by the setting up of subcentres to which semen was delivered from the main stations.

The primary object in the centres was to improve the breeding of dairy cattle, but, early on, two centres were set up to deal specifically with disease. Many cows in their respective areas were infected with the venereal disease, *Trichomonas foetus*. In these areas the Premium Bulls had soon become infected and thus passed the disease around. The use of A.I. has now almost stamped out the disease.

In 1947 it could be foreseen that England's future beef supplies from abroad, and particularly from Argentina, were likely to be precarious, so that much more would have to be produced at home. The A.I. stations were therefore invited to help in the production of suitable calves, by keeping bulls of some of the beef breeds. A plan was devised whereby this could be done without harm to the dairy industry; and this has, in fact, improved the efficiency of dairying by ensuring that the progeny of the poorer milk cows should not be left in dairy herds.

Beef bulls with dominant characters such as the Hereford (white faced) or Aberdeen Angus (black polled) were used so that the beef bull would 'color-mark' his progeny and thus prevent the crossbreeds from getting mixed up with the dairy stock of the country.

After a newborn calf has had a good supply of first milk or colostrum, premilk the cow to prevent overeating and resulting scours.

By 1951 inseminations from color-marked beef bulls had reached a figure of about 10 per cent of all inseminations, and in the last few years the proportion has increased markedly and now stands at about 30 per cent of the total, of about 1½ million cows, which are inseminated annually.

Early in the developments of A.I. in Britain it was realized that the scheme could not fully promote its major objective—the improvement of the dairy cattle

of the country — unless bulls could be found which would consistently produce good milking daughters. Hence, through National Milk Records, the Production Division has built up lists of Progeny-tested bulls whose daughters have given yields 10 per cent or more above the breed average. This work has focused attention on the whole question of methods of progeny testing and means of providing bulls which will transmit milk with certainty. Many experiments are now in progress in this field.

Another important point that clearly emerges from A.I. results is that, in districts where A.I. has been in operation for three or four cow generations, and where therefore the genetic make-up of the animals is much the same, there is still a great difference in milk yields, as between different herds. — These differences arise from differences in feeding and management as between one herd and another. This has thrown into perspective the relative importance of herd management and breeding.

Another problem that has been thrown up is that of collecting semen from valuable, old, progeny-tested bulls which for one reason or another cannot be used by the standard procedure. Miller and Evans in America have shown that collections can be achieved by massage of the vas deferens per rectum, while Thibault in France has adapted to bulls an electrical-stimulation method, invented by Gunn in Australia for use on rams. This apparatus has been improved upon by Marden in U.S.A. and simplified by Rowson at Cambridge.

As already mentioned, some of the earlier experiments with A.I. were concerned with transporting sperm over long distances. After the development of stations in Britain, consideration was given to the question of developing an export in semen, with the object of enabling small-scale breeders in other countries to obtain the same benefits as were available in Britain.

A Ministry of Agriculture Committee, set up in 1951, recommended that the project should be given a trial, and experimental shipments were made to discover how reliable the method would prove in practice. About this time, however, experiments had already begun which later showed beyond doubt, that the export of semen was quite practicable. Parkes, at the National Institute for Medical Research in London, who had been experimenting on the deep-freezing of blood and other body tissues, was joined by Polge and he attempted to apply the method to bull semen.

The first inseminations of froz-

en semen on cattle were done at the Reading A.I. station, but, from a large number made, only one resulted in a calf. Later on, Polge joined forces with Rowson at the Cambridge A.I. station and, after many adjustments to the technique, they produced a method which was successful, giving a conception rate within one or two per cent of that obtained by the use of the liquid method of storage. The basis of the method is that of dilution and cooling (as in the case of liquid semen) to 40°F; but then adding glycerol and standing overnight to let this soak into the sperms. The semen is then put into 1 c.c. glass ampules which are sealed, cooled slowly to 12°C and then, as quickly as possible, to —79°C by the use of an alcohol bath to which solid CO^2 is added. The ampules are then stored in a well-insulated cabinet under those conditions. If, on opening the cabinet, any of the tubes rise much above —79°C, the sperms are liable to deterioration; hence a recent development in the United States is the use of mechanical refrigeration, whereby the storage cabinets can be held at a temperature of —120°C to —200°C as required.

The practicability of deep-freezing, as applied to export, was demonstrated by Rowson and van Rensberg, who sent deep-freeze bull semen by air mail from Cambridge to South Africa, where it was successfully used on a farm over a period of some six months after its arrival. These experiments were begun only some four years ago; we therefore do not yet know how long sperms will remain fertile in the deep-freeze state; it is, however, known that they will survive for at least three years.

Milking cows without keeping records of production is like driving a car while blindfolded; you're free to steer but you can't know which way to turn.

The use of deep-freeze semen, however, is by no means limited to export. In connection with export it will provide a safeguard, inasmuch as the semen can be put in quarantine until the bull which provided it is given a free bill of health. Deep-freeze semen will enable 'nominated' inseminations to be provided by A.I. stations anywhere, for use anywhere in the world that a particular breeder may wish to use a particular bull.

In many areas where seasonal calving is the rule it will enable much higher numbers of cows to be inseminated from a good proven bull, for his semen can be collected throughout the year and stored for use during the main breeding season. Moreover, in the

case of the exceptionally good proven bulls, the method will enable a much larger number of cows to be inseminated annually. With liquid semen, some 3,000 to 4,000 cows a year can be inseminated annually from a single bull, whereas with deep-freeze semen, it has been variously calculated that a bull could be mated with 10,000 to 20,000 cows a year. Theoretically it should be possible to keep bull sperm alive at −150°C for ever; and if this should prove true it will open up really immense possibilities. Even if semen can be kept fertile for no more than 10 years, the deep-freeze technique may revolutionize breeding methods. Thus, after some initial inseminations from a young bull in order to prove him, his semen can be collected regularly and laid by in a deep-freeze bank; when his breeding value has been assessed, his semen can either be used or destroyed according to the results obtained.

Until quite recently it has not been found practicable to apply A.I. on any large scale to pigs or horses, the reason being that it has not been possible, by normal methods, to keep the sperm fertile for any length of time outside the body; some progress has indeed been made in this direction by Ito and others in Japan, by the addition of glucose to the semen.

About two years ago, however, Roy and Bishop at Cambridge showed that the use of glycine as a dilutor prolonged the life of the sperm. Polge applied the method successfully to boar sperm showing that, with added antibiotics, this could be kept fertile outside the body for about two days. But, as with natural matings in this species, a large volume—some 50 c.c. as compared with 1 c.c. in cattle—has been required to inseminate a sow; even so, however, some 30 sows can be inseminated weekly from a single boar. The conception rate, as measured by the proportion of sows which give birth to pigs (in cattle this is measured by non-returns after 3 months) is about 60 per cent and litter size is normal—averaging about 10 for gilts and 12 for sows.

Three young beef cows with heifer calves can grow to a herd of 30 females in 10 years if one-fourth of the offspring are saved each year for breeding purposes. Many farmers "get on their feet" financially in this way.

So far this method of deep-freeze has failed to give results with boar semen. Further research, however, may provide the remedy. At present, three British stations are running pilot schemes for boars.

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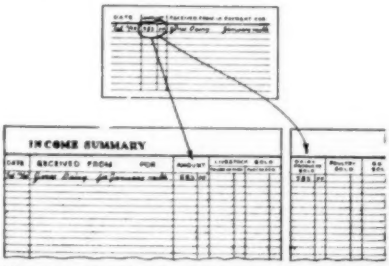

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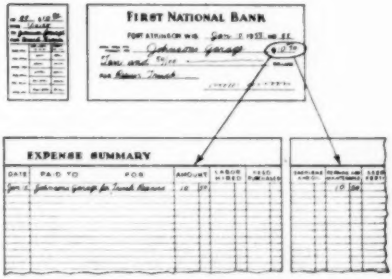

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For cash purchases which are easily forgotten and difficult to prove, special forms are provided in the Easy-Way Deposit Book. They tell you how much cash you withhold from deposits and make it easy to match up expenditures with cash you handle.

There's nothing else like the Easy-Way System. Depending on how you want to use it, it can provide a complete and comprehensive accounting of your farm business or only that required for your tax return. One farm family, using a similar system, figured time spent paid them $25.00 an hour. Order your Easy-Way System today. Your money back if you aren't completely satisfied. Send only $2.00 to the address below.

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World Population and The Future of Your Farm

You've heard that the growth of population holds great promise for the future of farming. Now, a group of authorities announce results of a systematic survey on the subject.

If trends continue as they expect, world population will nearly double in fifty years. Looking ahead only twenty-five years, the Population Division of the United Nations expects the number of world consumers to increase approximately 40%.

In 1650, only 474 million people inhabited the world. In 1900, there were 1550 million. Now, world population probably exceeds 2,600 million. By 1980, researchers expect 3,625 million.

Why population is climbing so fast is no secret. In your own community, compare ages on old tombstones with those in the obituary columns of your daily paper. There's a surprising difference. The impact of modern medicine is even greater in the "backward countries" where the death rate has fallen sharply but the birth-rate remains about level.

What about the next twenty-five years? The outlook for enough food is "frightening in the extreme." Adequate nutrition for all peoples would require a progressive increase in the rate of food production of 2% per year. This is a much higher rate than any country has ever achieved at any time with a major food crop. In only five cases in world history, have individual countries attained one-half this increase in 40 years.

The supply of farm land is, of course, the limiting factor. During the last century, the world food supply was solved by the New World which increased acreage nearly 40% Now, no new world's exist and farm land is continually being diverted to other uses and destroyed by erosion.

The big demand for additional food will rest on farms just like yours. For farmers in general, this surely means a larger share of the world's rewards. For young farmers, it promises a gradual but continuing improvement in income and increased value of their farm property. For men and manufacturers who serve farmers, it means a growing and demanding market for more and better equipment of all kinds.

The long-time future of farming looks bright indeed.